

THE IRON AGE

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York

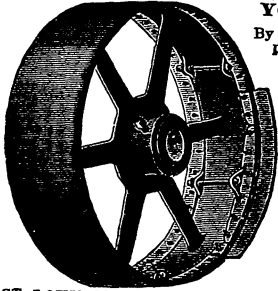
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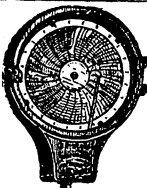
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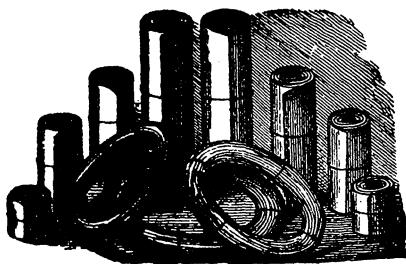
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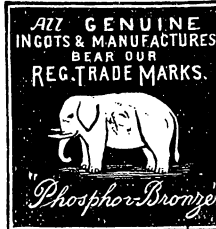
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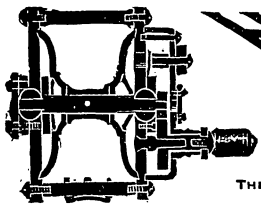
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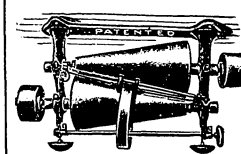
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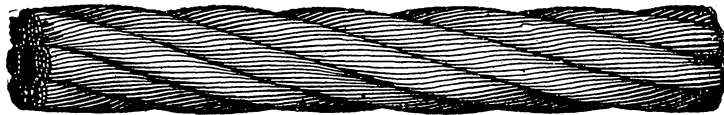
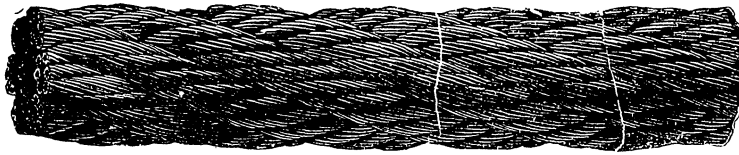
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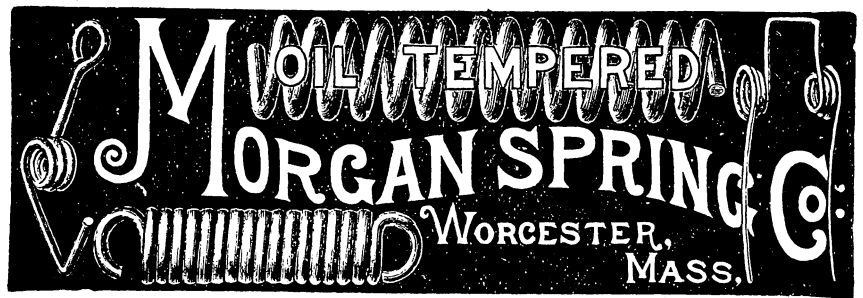
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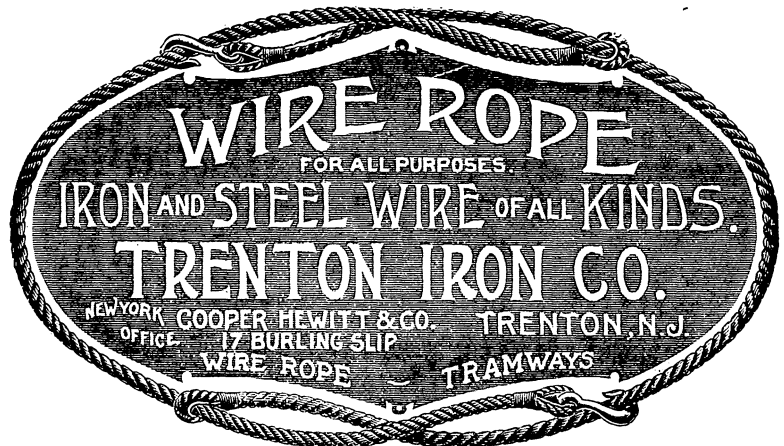
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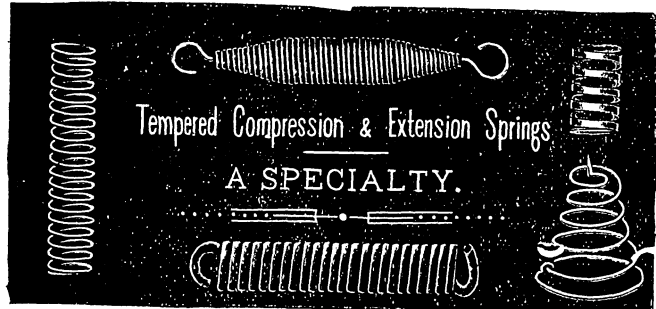


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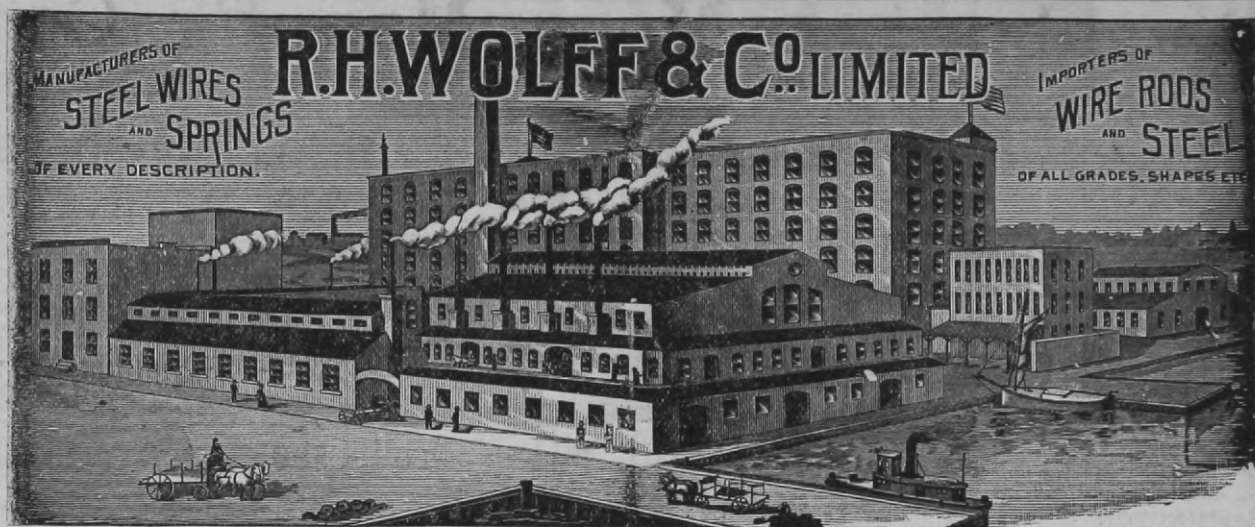
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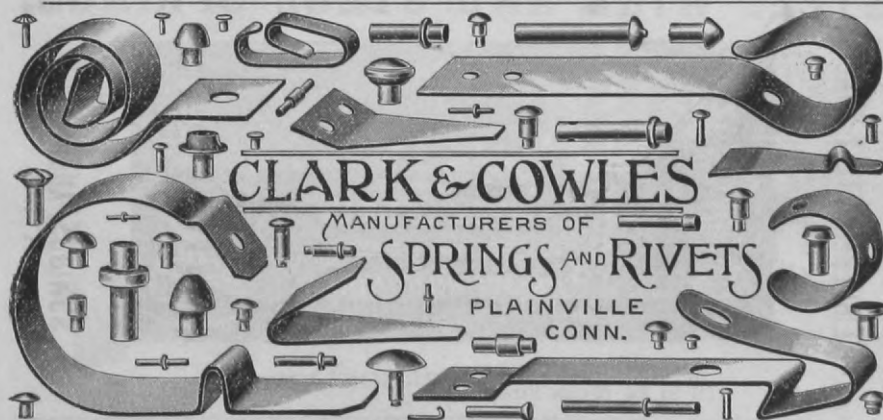
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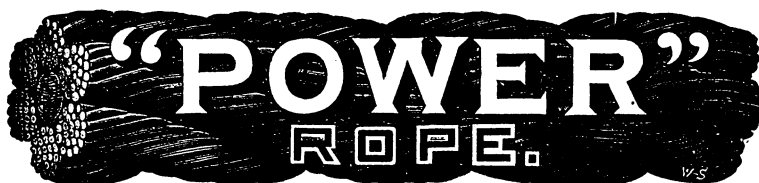
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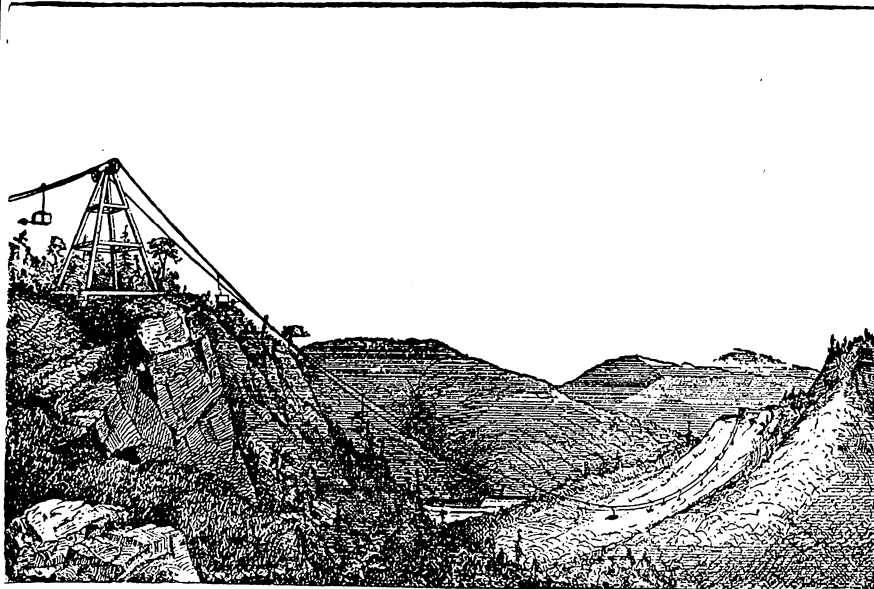
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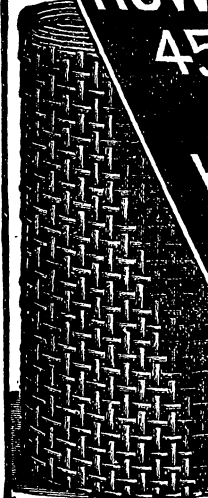
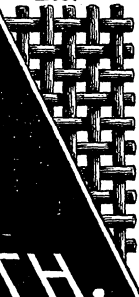
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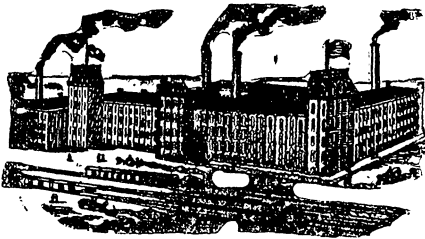
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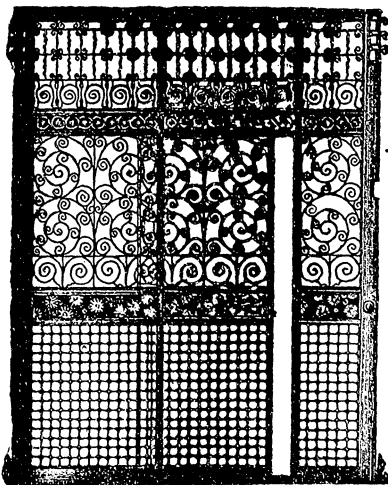
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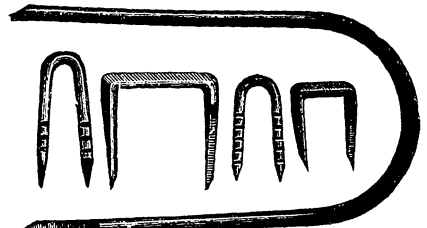
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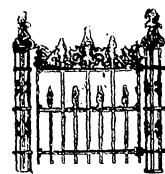
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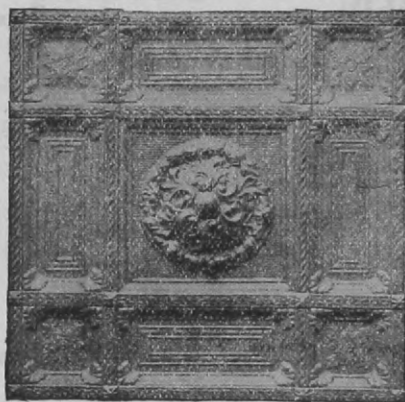
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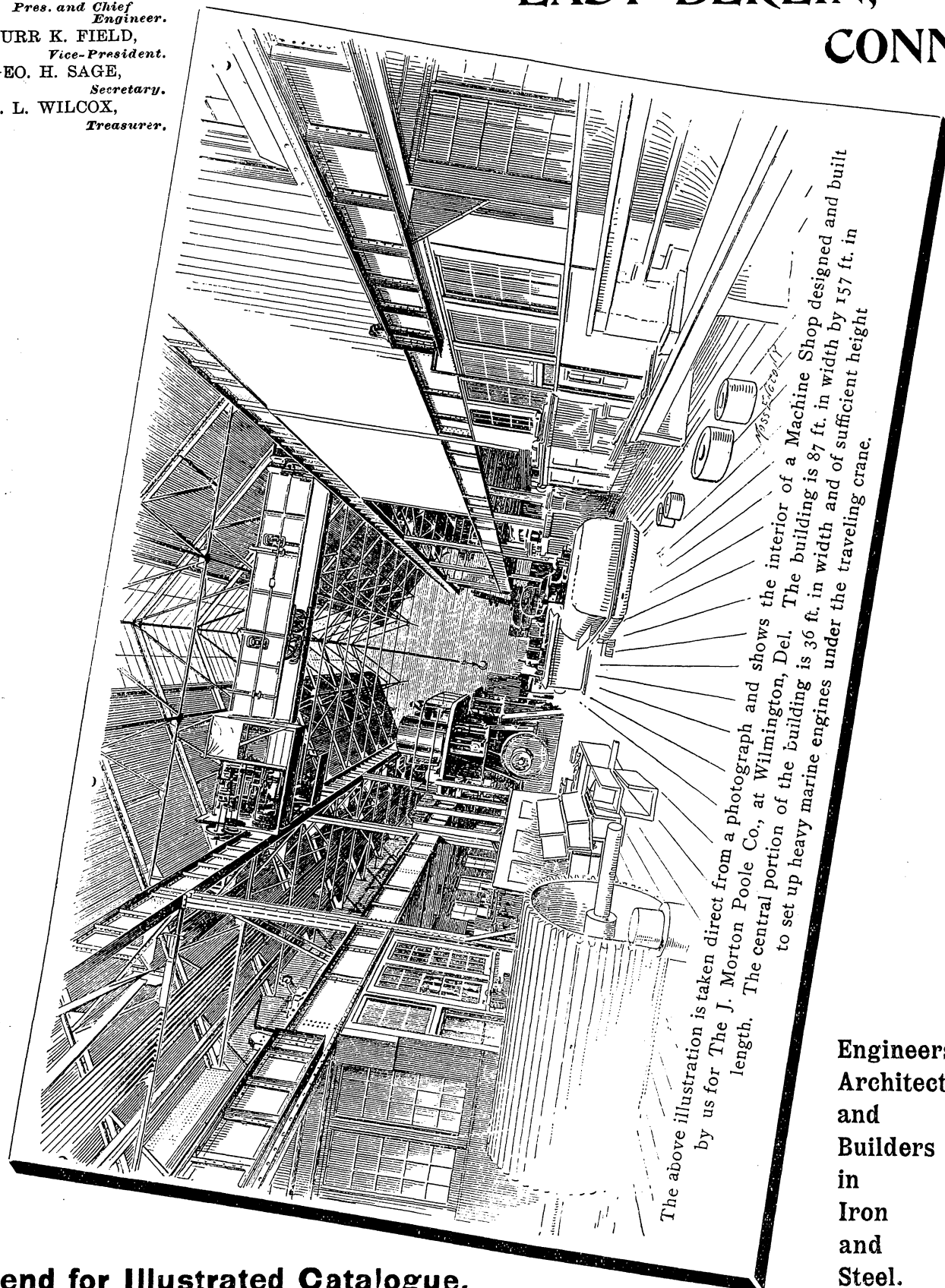
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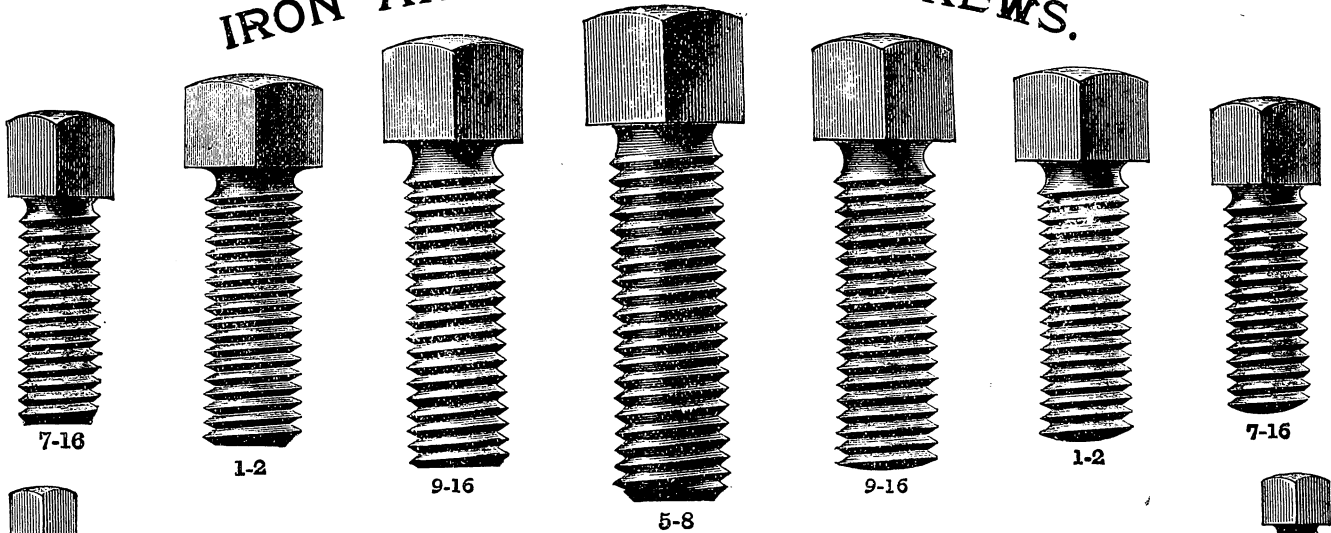
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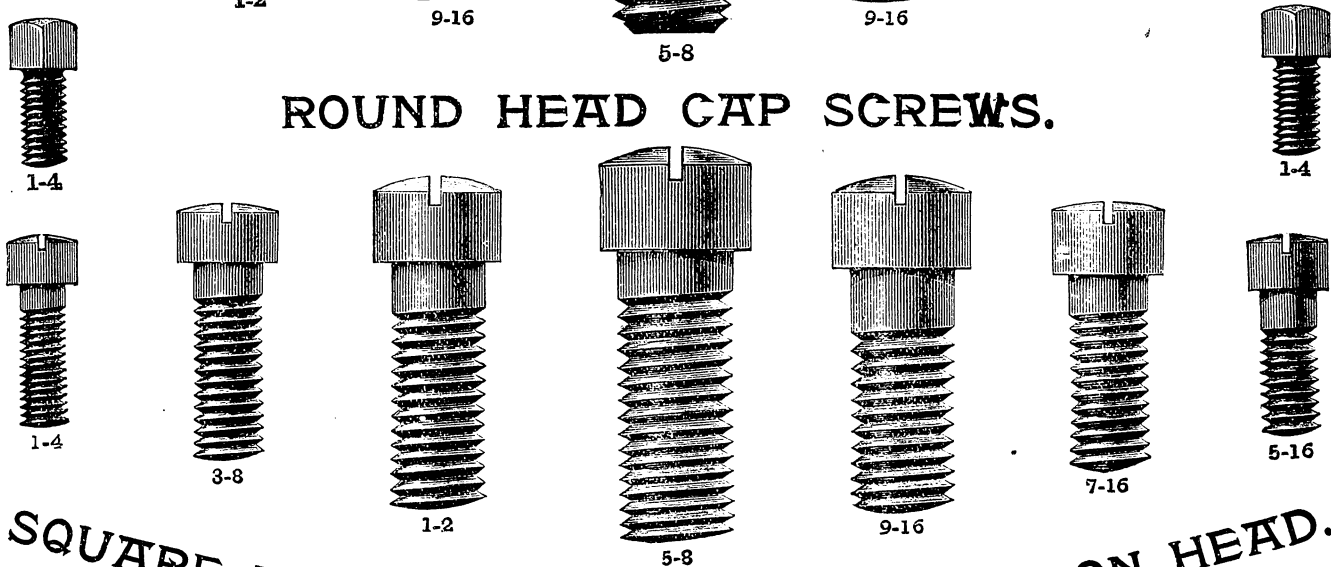
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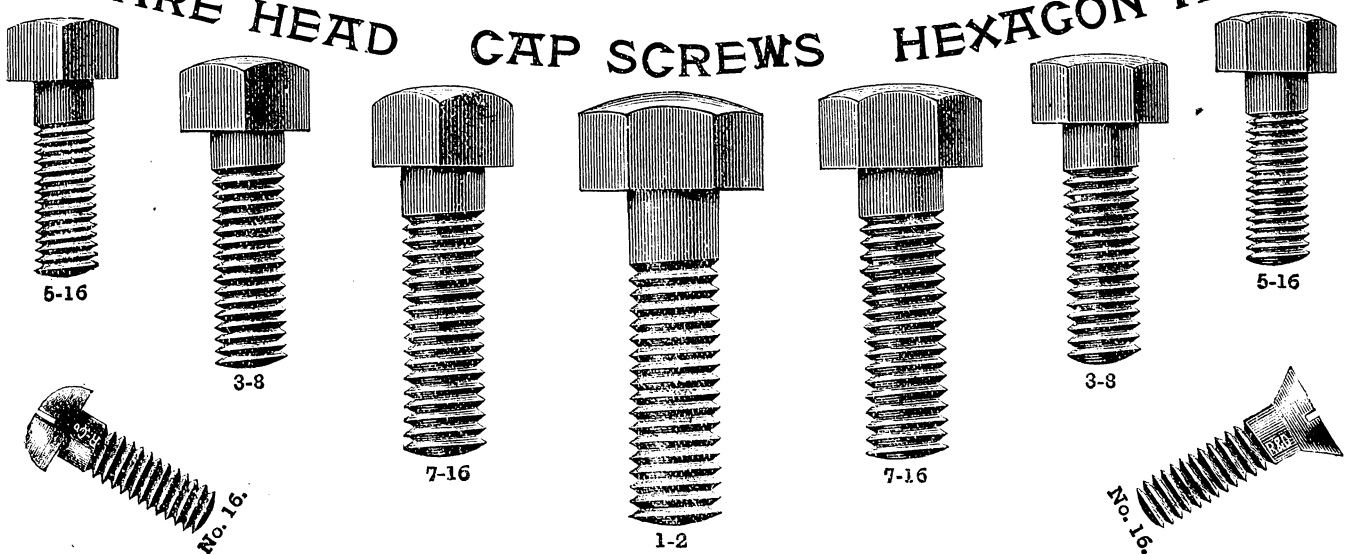
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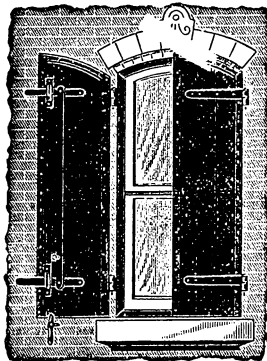
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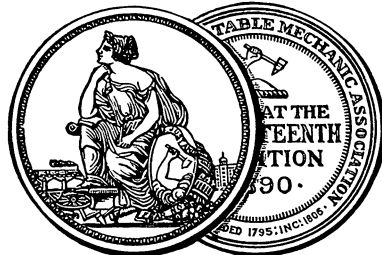
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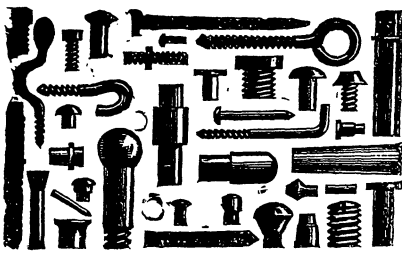
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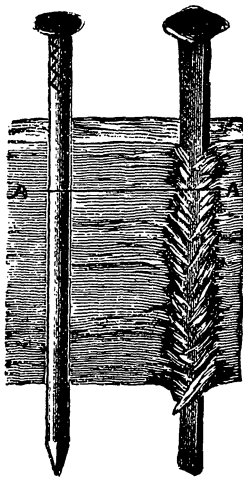
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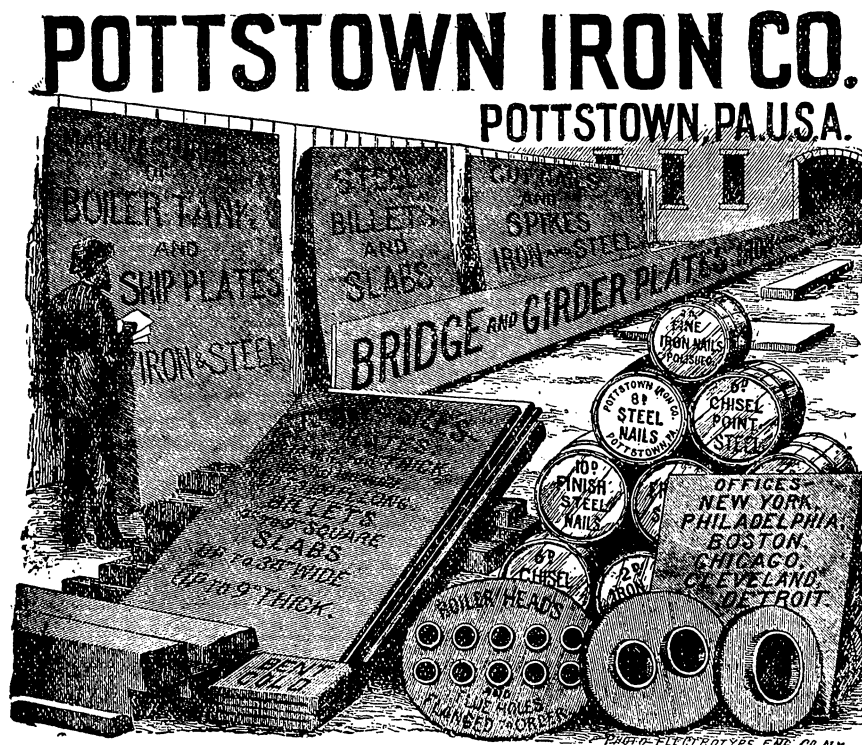
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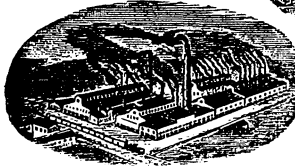
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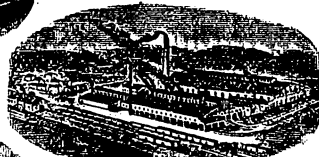
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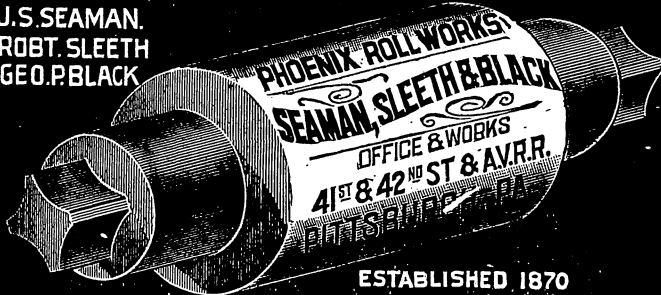
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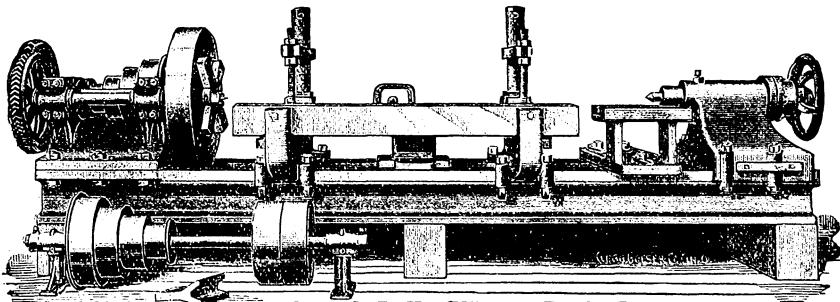
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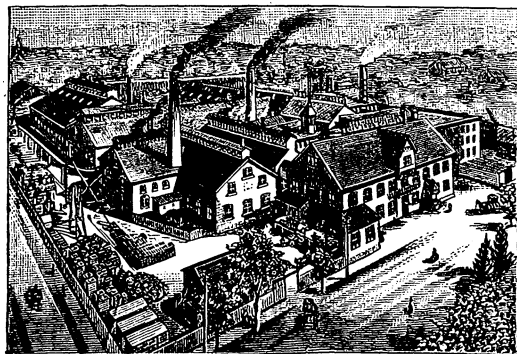
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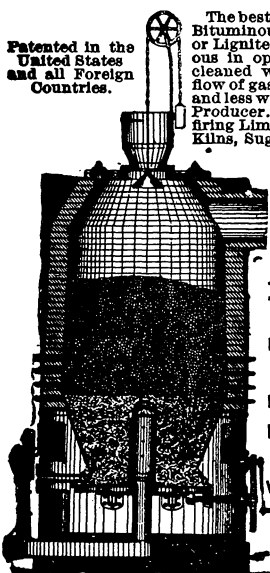


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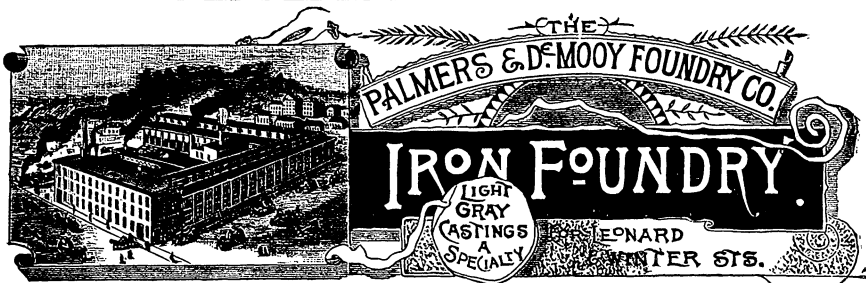
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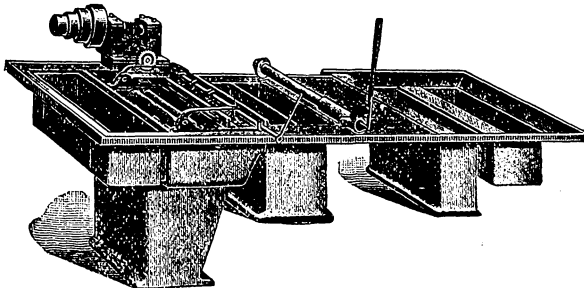
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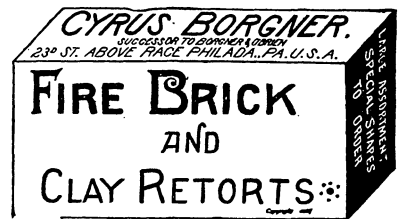
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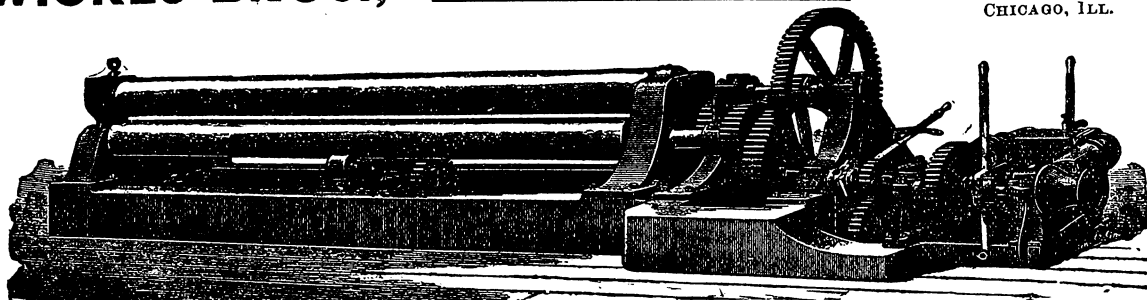
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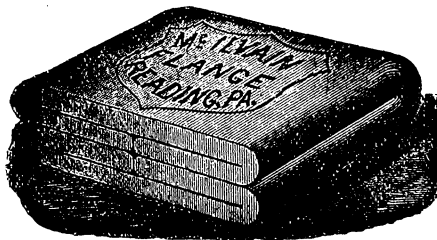
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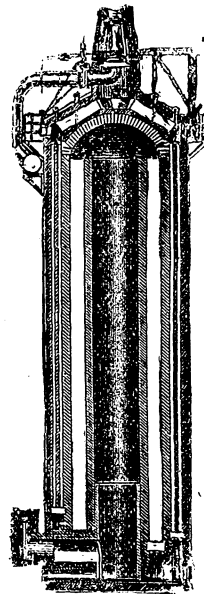
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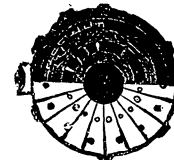
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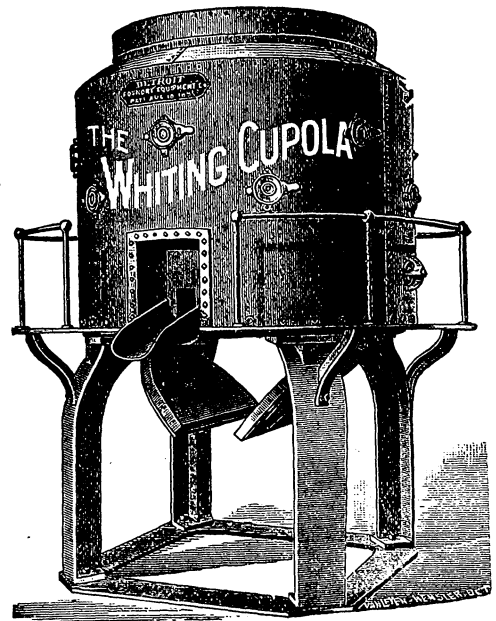
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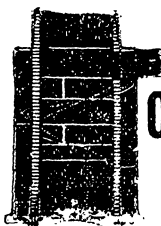
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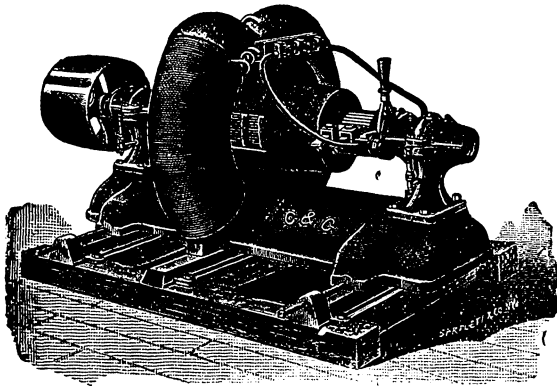
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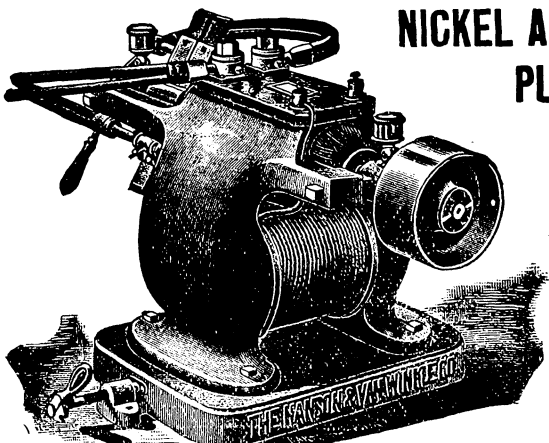
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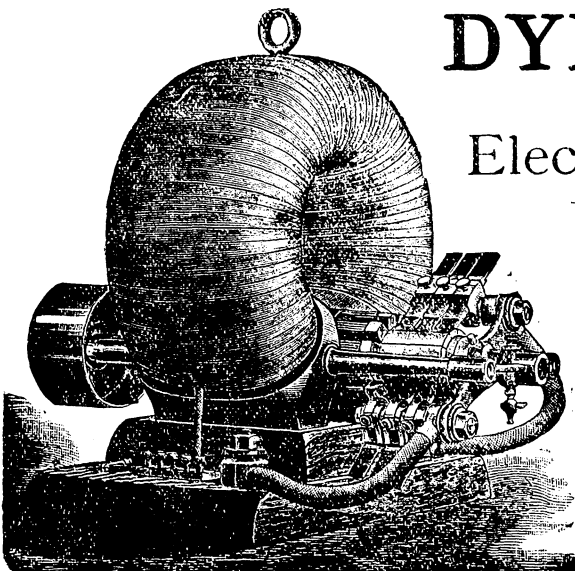
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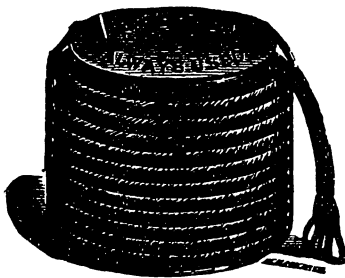
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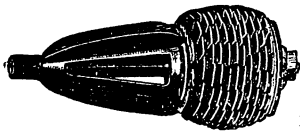


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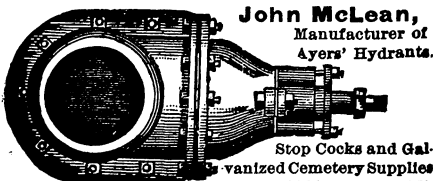


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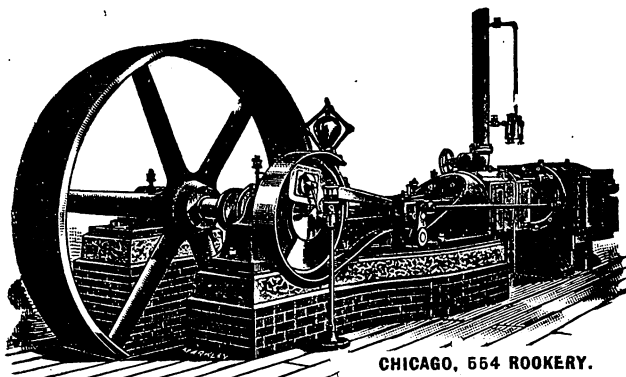
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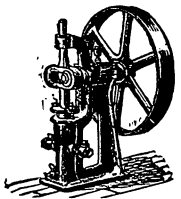
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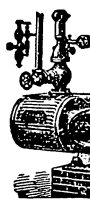
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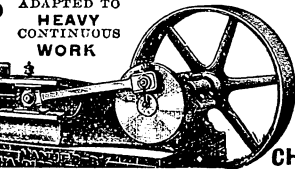
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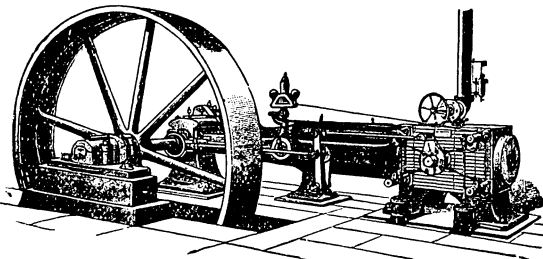


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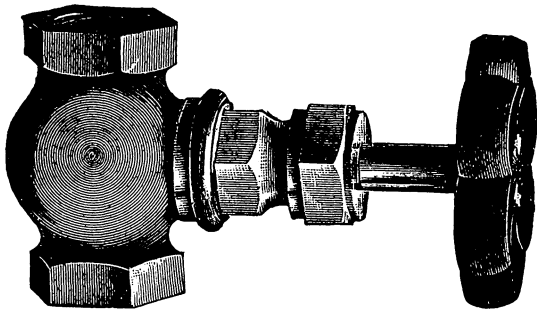
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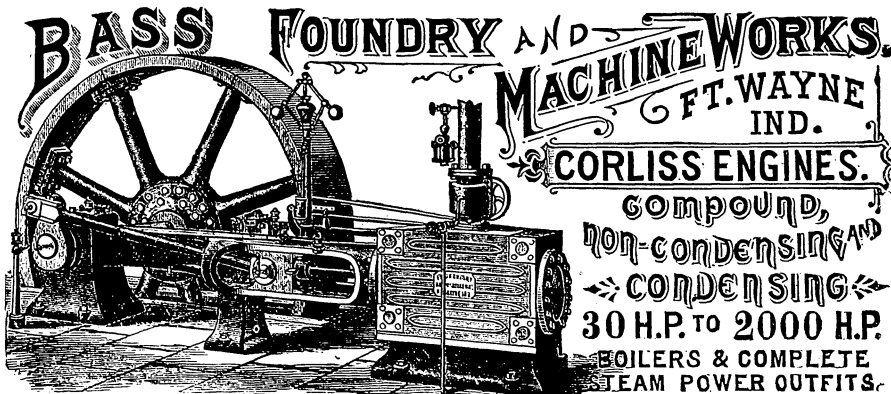
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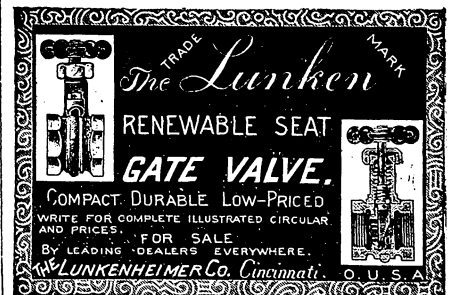
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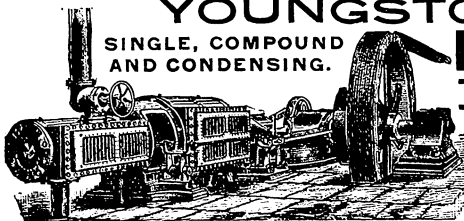


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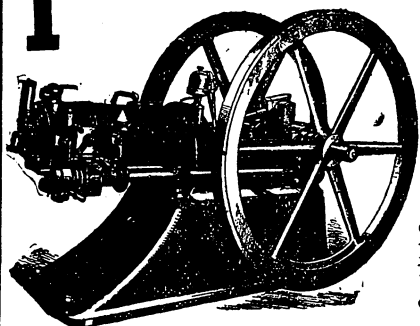
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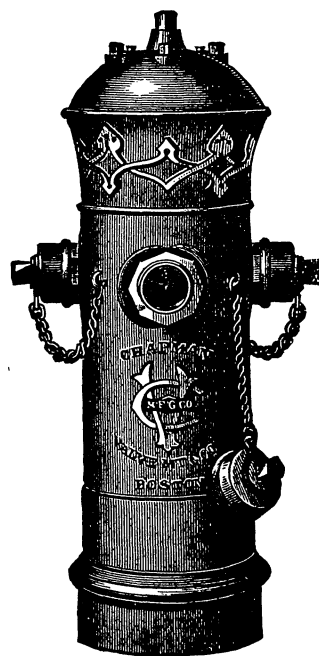
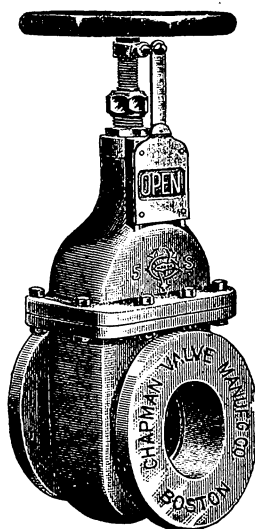
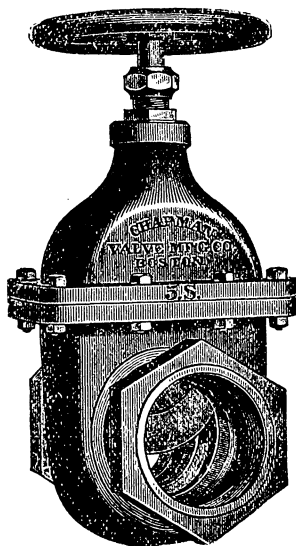
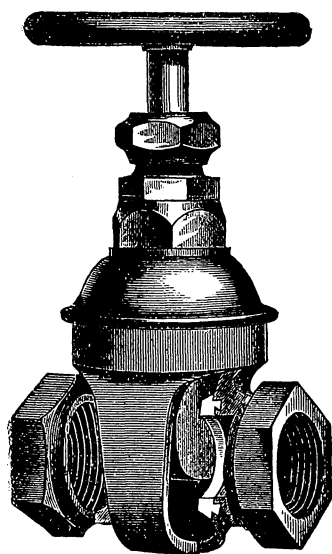
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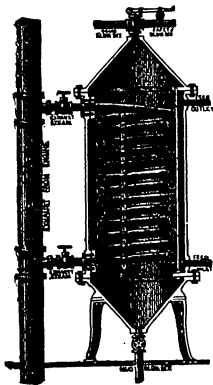
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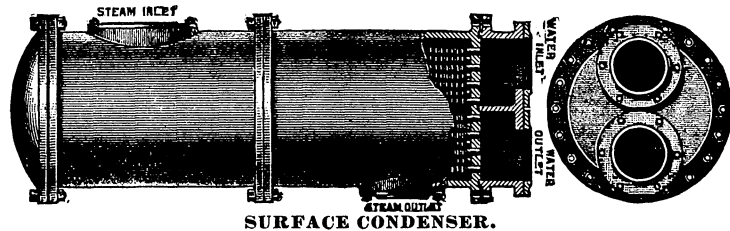
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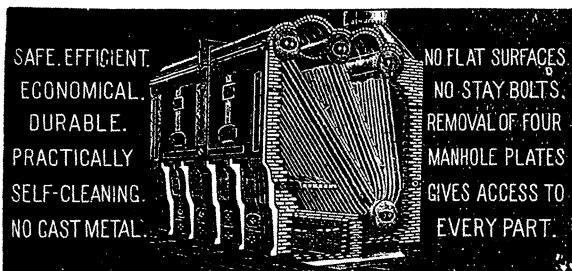
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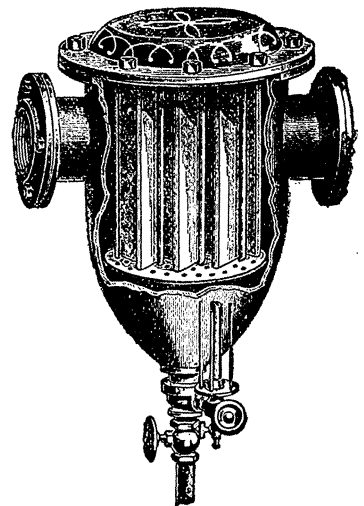
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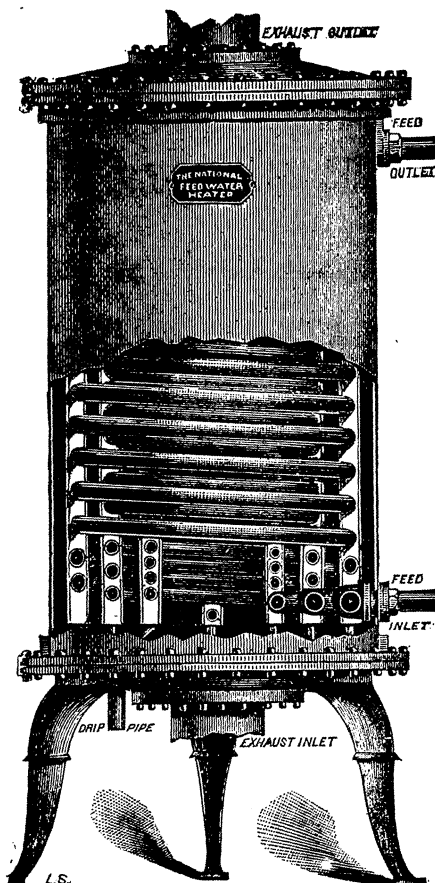
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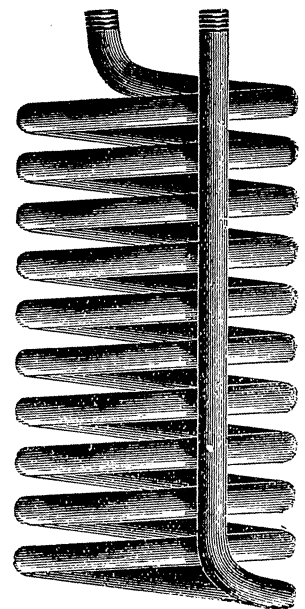
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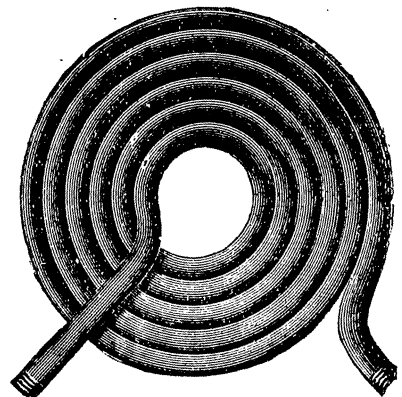
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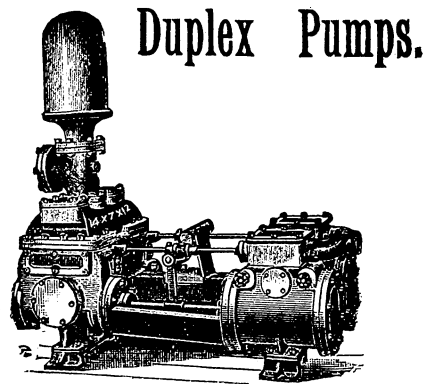
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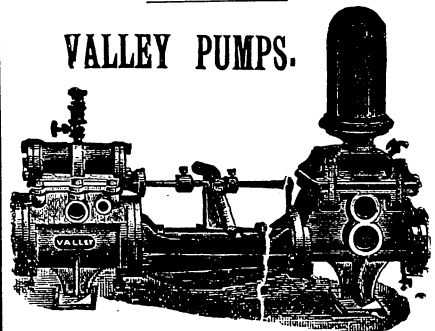
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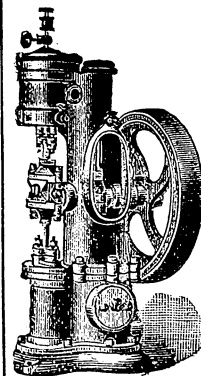
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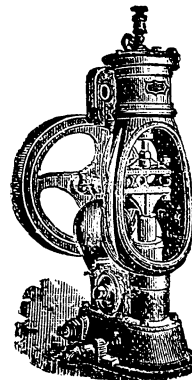


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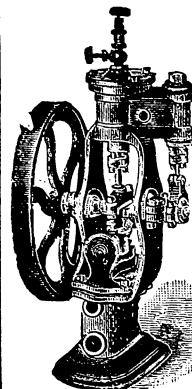
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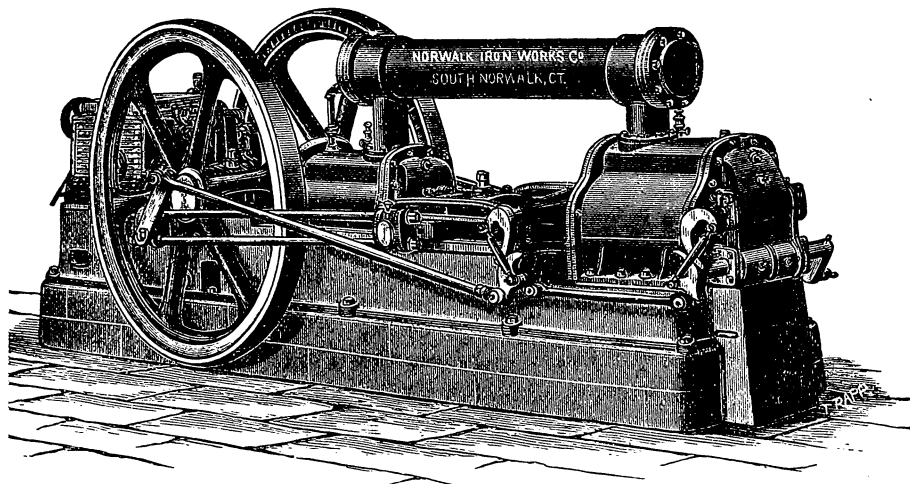


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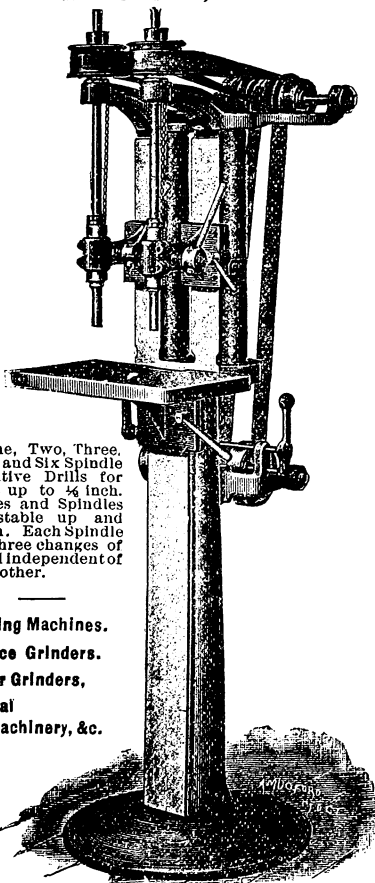


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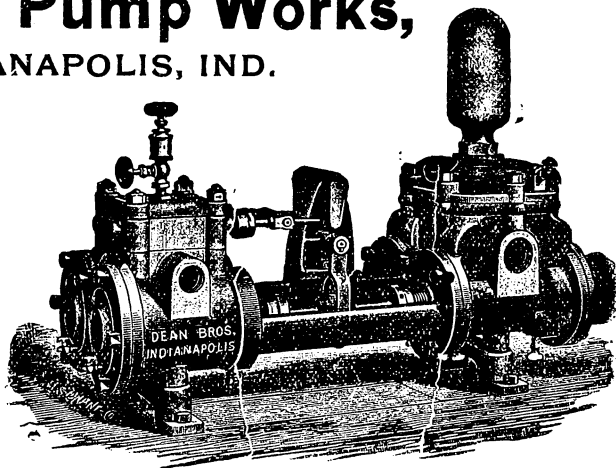
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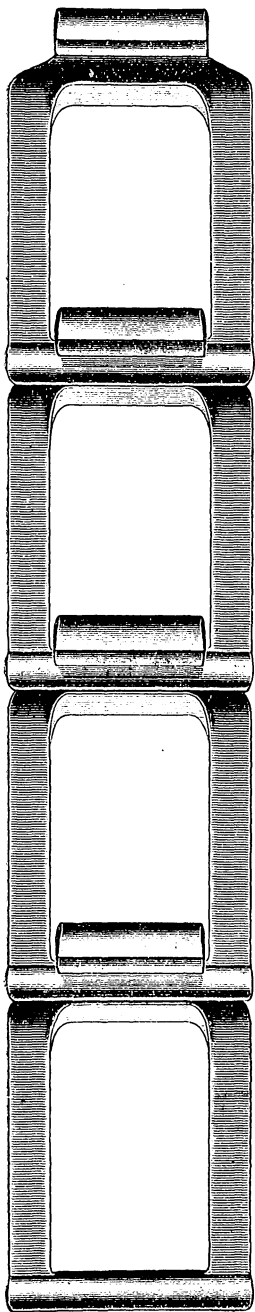
MANUFACTURERS OF

Wrought Steel Builders' Hardware

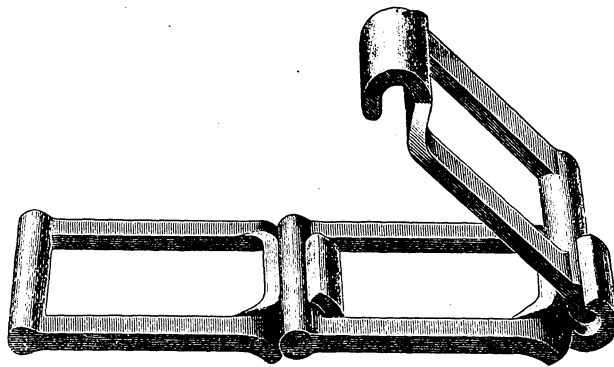
AND

Wrought Steel Detachable Link Belting.

(PATENTED.)



No. 45.
Actual Size.



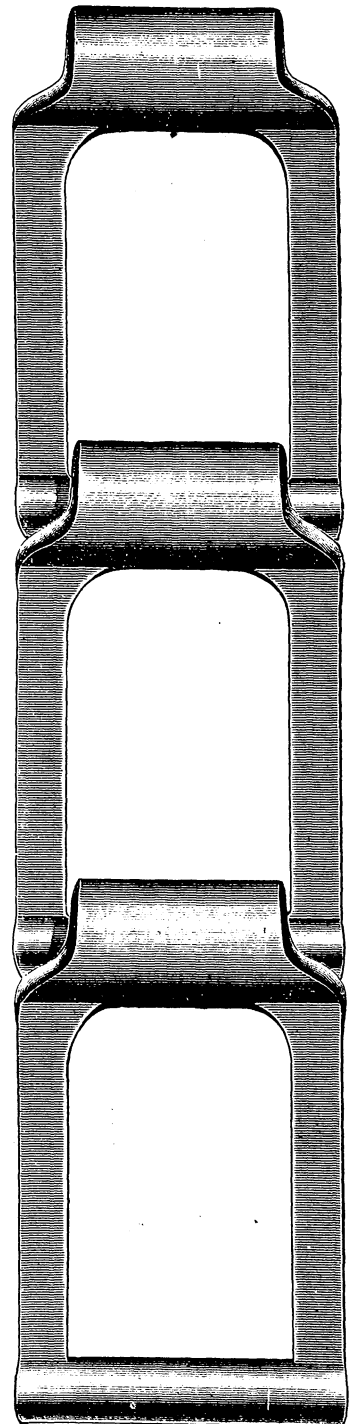
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It is uniform in pitch, all the links are exactly alike, and free from flaws and imperfections.

By reason of its strength and reliability a smaller and lighter size of this Chain will in many cases do the work of a larger size of Malleable Iron.

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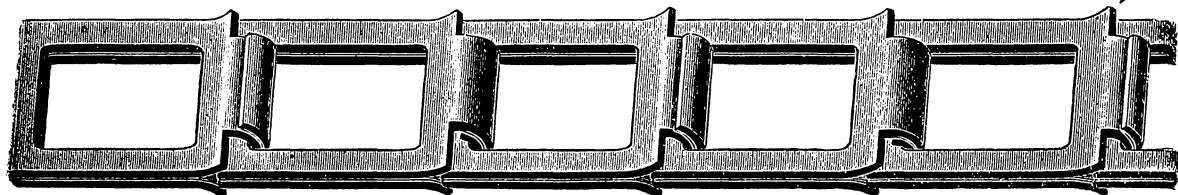
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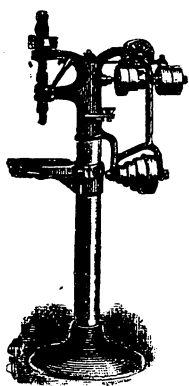
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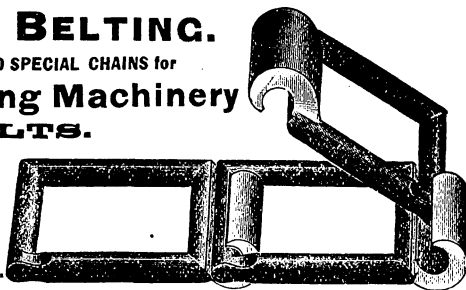
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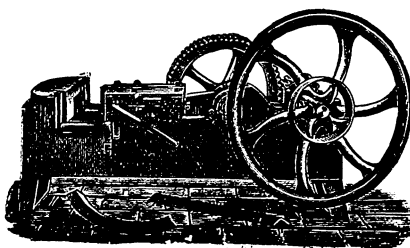
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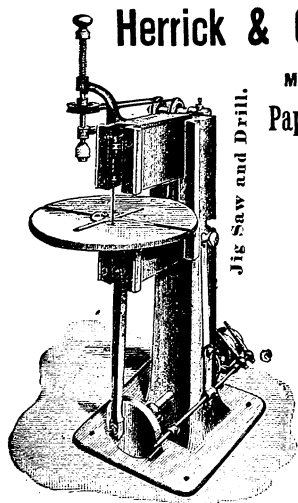
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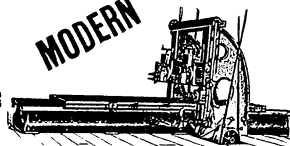
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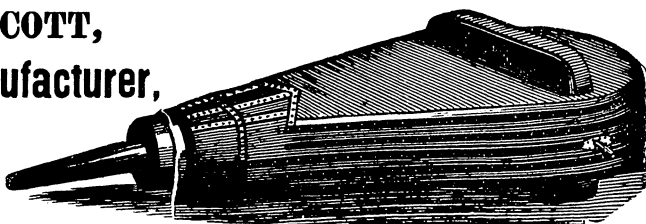
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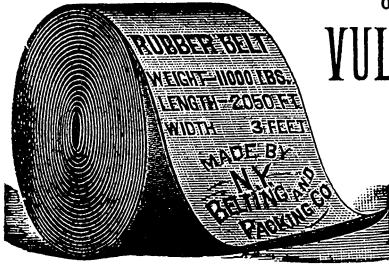
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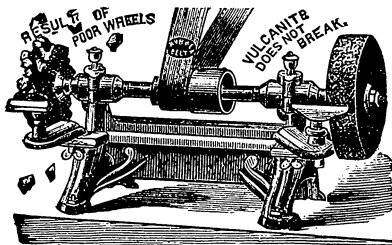


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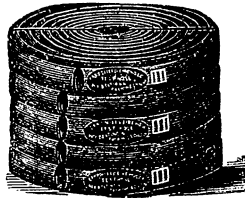
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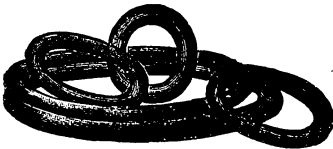
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CHICAGO, 151 Lake St.  
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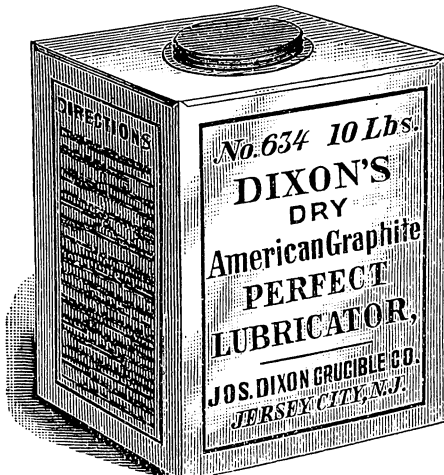
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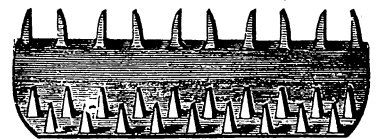
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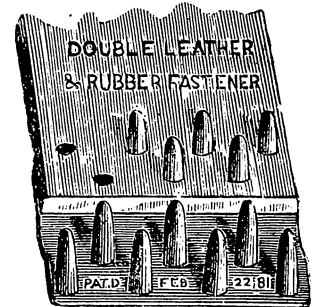
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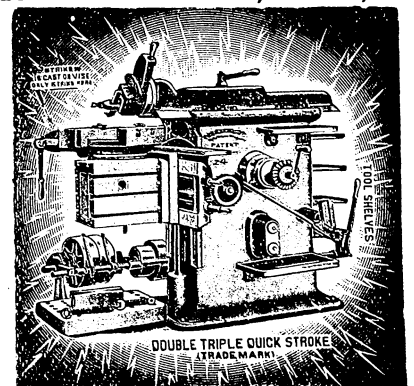


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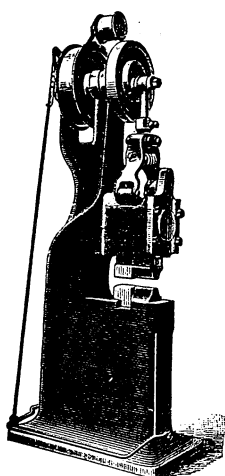
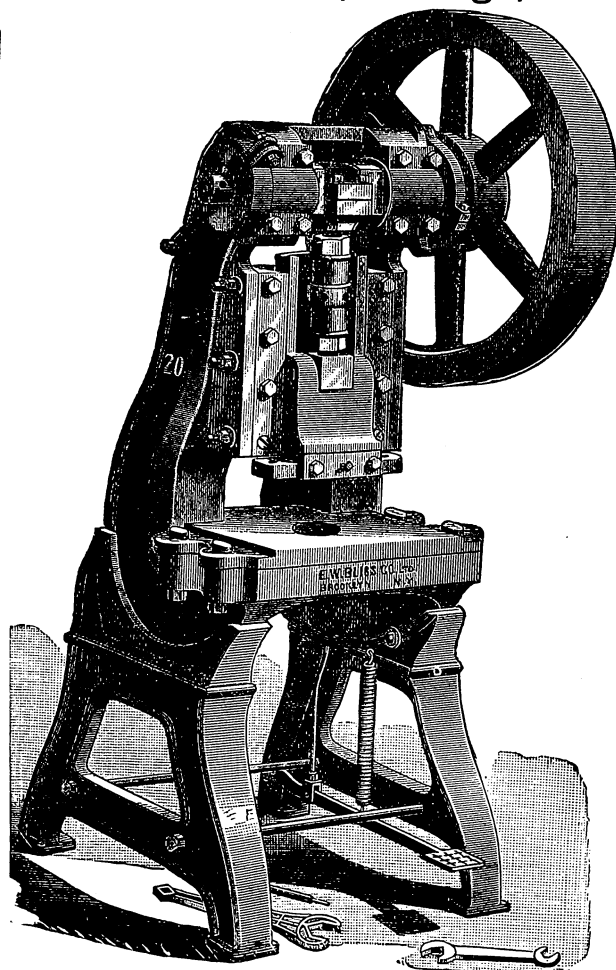
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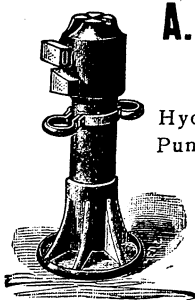
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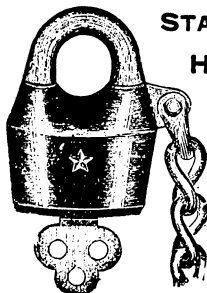
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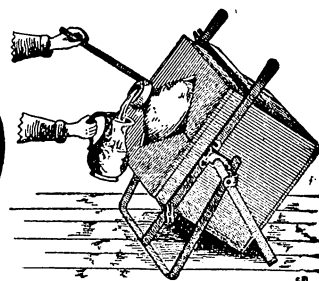


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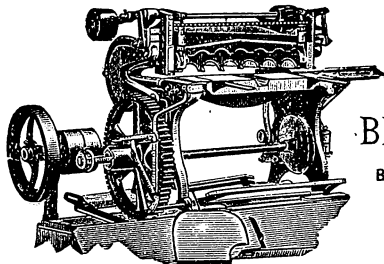
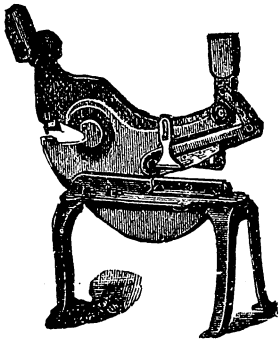
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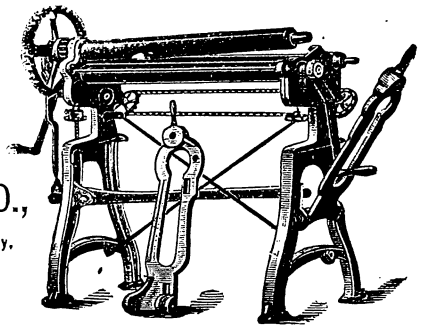
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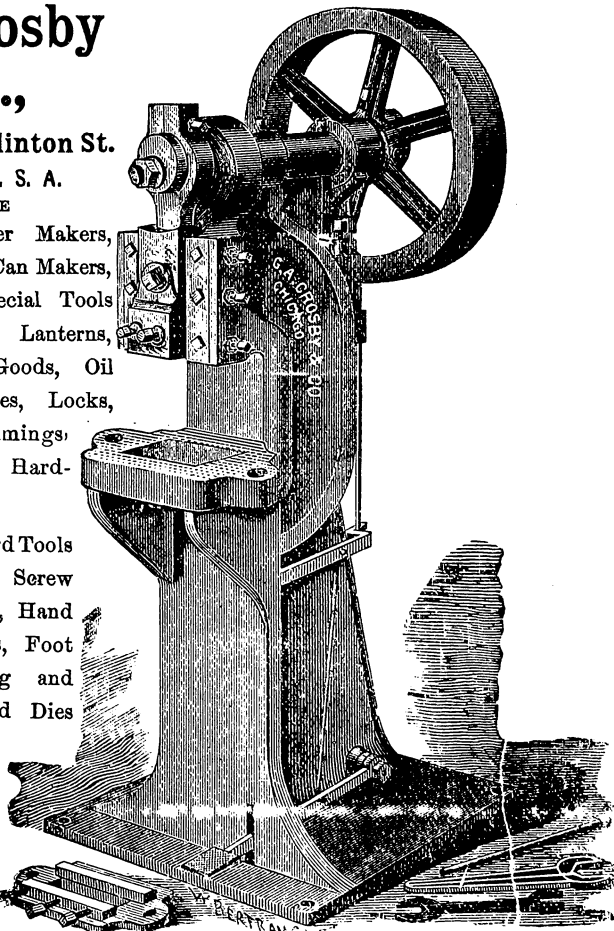
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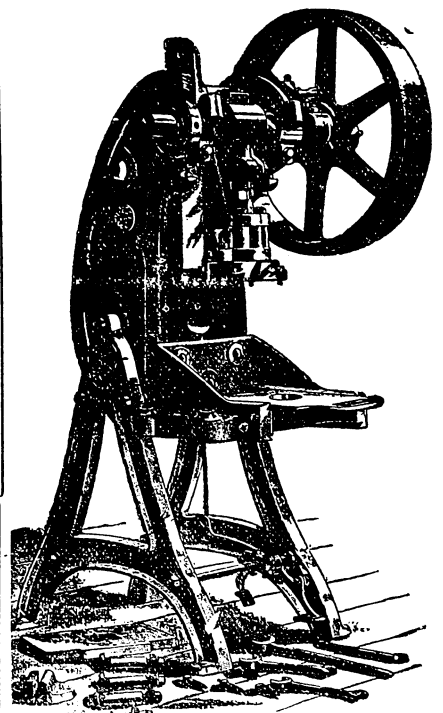
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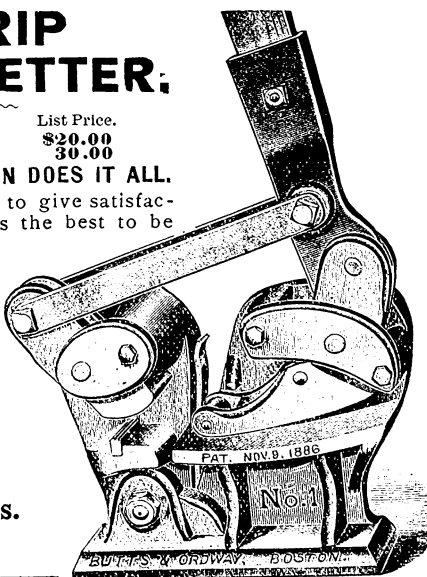
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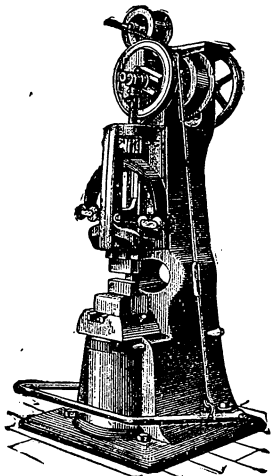
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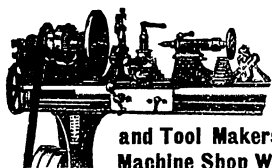
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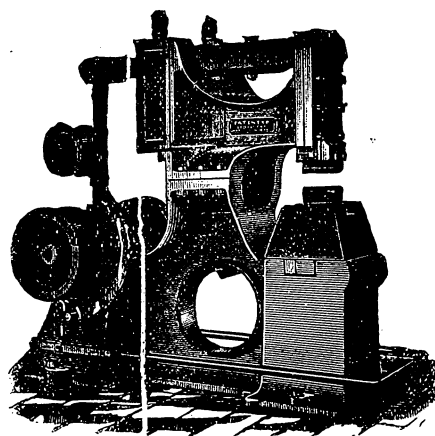
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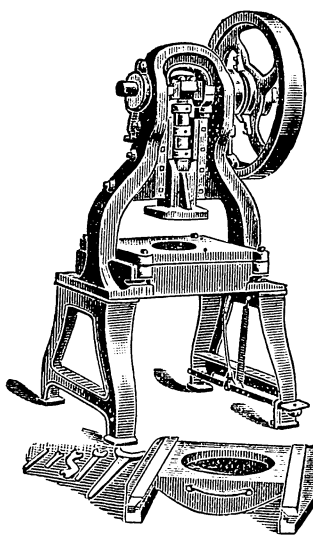
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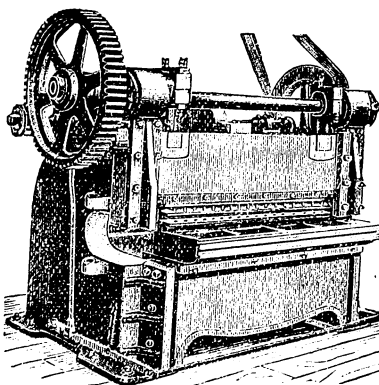
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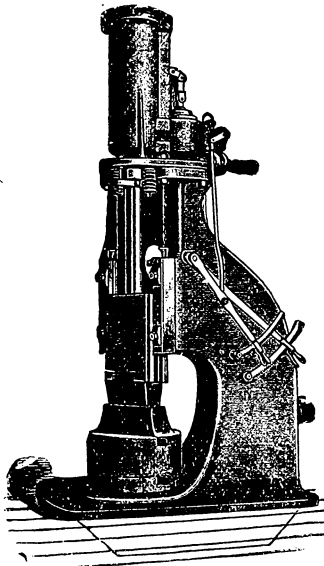
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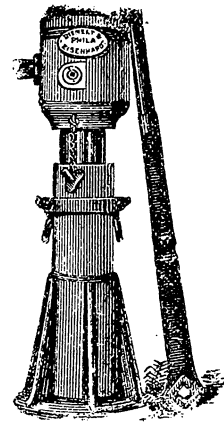
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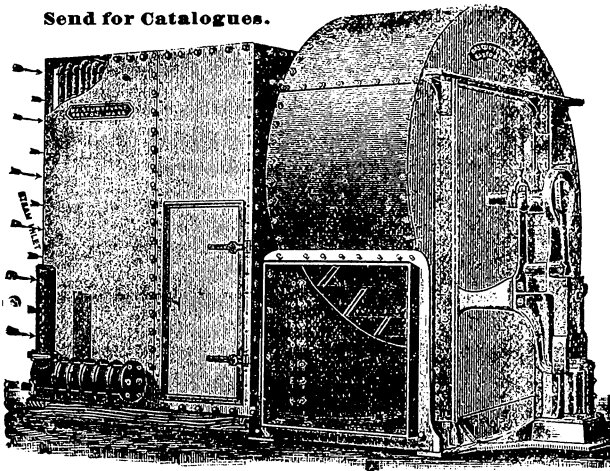
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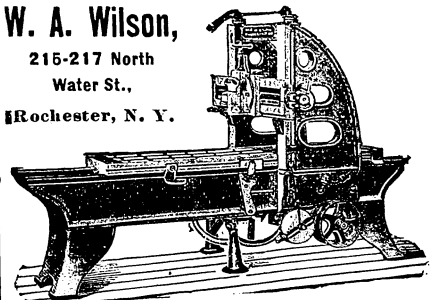
16 South Canal St.  
CHICAGO.

130 North Third St.  
PHILADELPHIA.

**W. A. Wilson,**

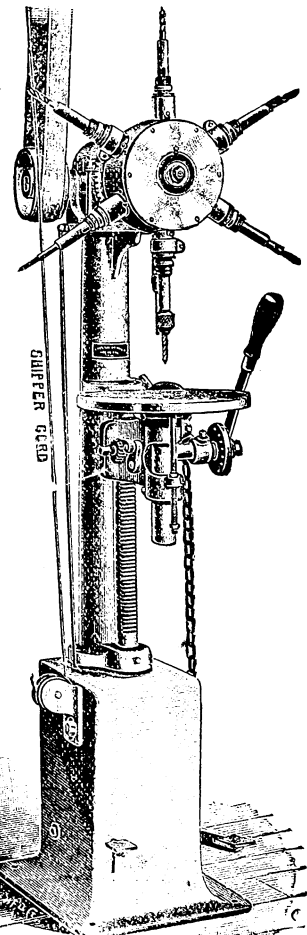
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Improved Iron Planers a specialty. 20 x 20, 22 x 22, 24 x 24 up to 42 x 42, to plane any length. Send for description and price-list before purchasing. Manufacturers' agent for other tools and machinery. Mention *The Iron Age*.

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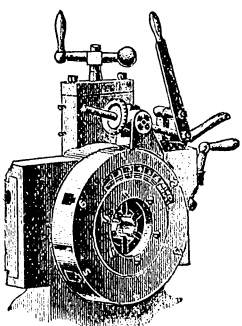
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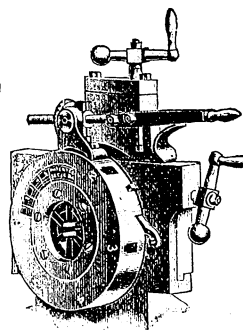
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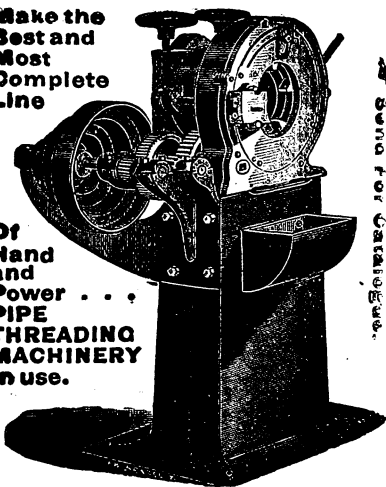
"Peerless" Head showing  
dies closed.



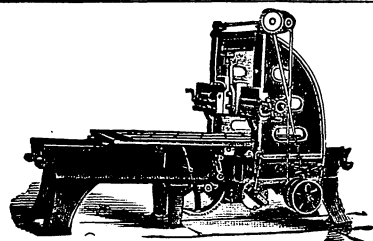
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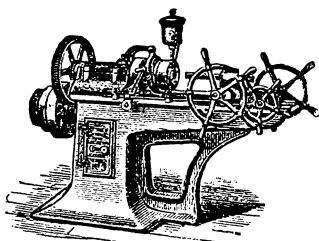
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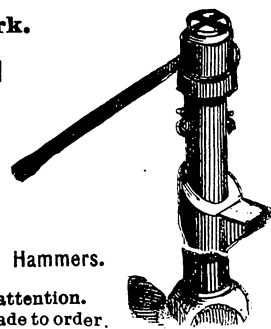
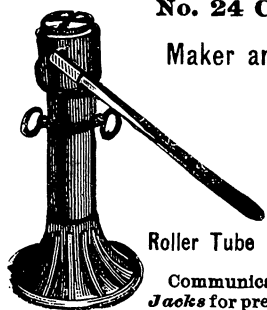
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**Punches.**



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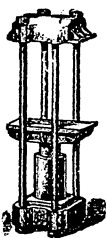
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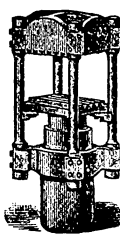
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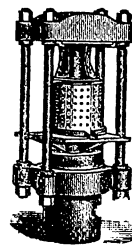
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Belt Presses,  
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And over 50 varieties  
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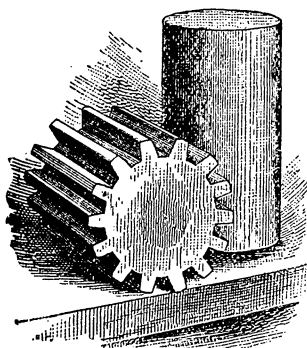
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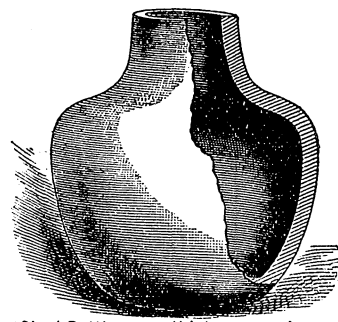
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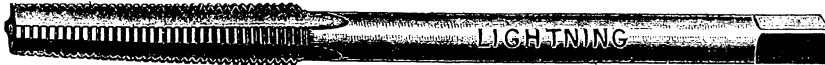
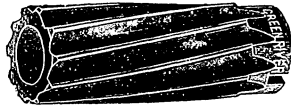


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New York Agency for Wiley & Russell, 114 Liberty St.

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Two "Points" about it—only 2 (There are plenty more, but we only mention these two here.)

I

The First Cost to you of MAULE'S "SKELETON" PIPE DIE is less than that of any other Pipe-Threading Die—and

2

Before it becomes dull from use it will cut as many perfect threads as the best solid die extant, and when it is dull, you don't throw it away and buy a new one—Oh, no! You simply sharpen the cutters on a common grindstone, and so make it practically as good as it was at first, and this sharpening process may be repeated a number of times.

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DO NOT SEND US ANY POSTAGE STAMPS.

You may return such sample to us, at our expense, if, after seeing it, you do not consider it worth the price. Don't the above sound as if it might save you some money—if TRUE?

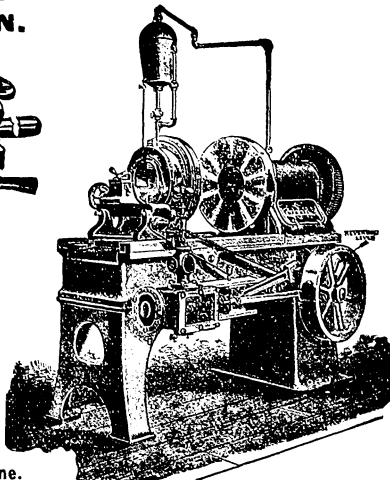
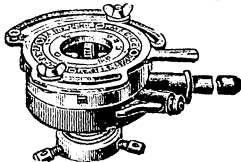
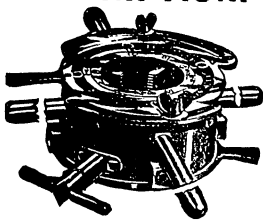
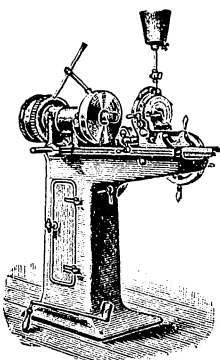
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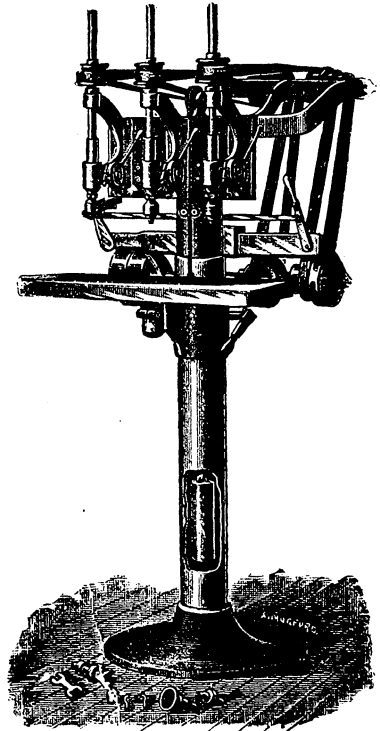
PIPE THREADING AND CUTTING TOOLS OF ALL DESCRIPTION.



Write for Catalogue showing the most complete line of  $\frac{1}{4}$  inch to 16 inch for hand, belt, engine and with electric motor attachment.  
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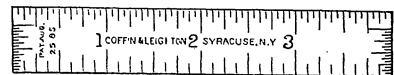
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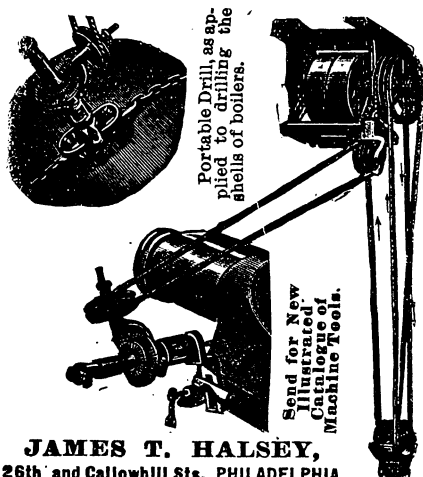
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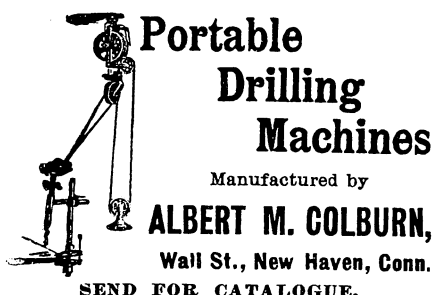
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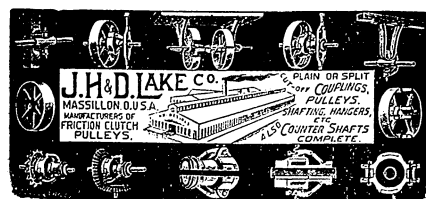
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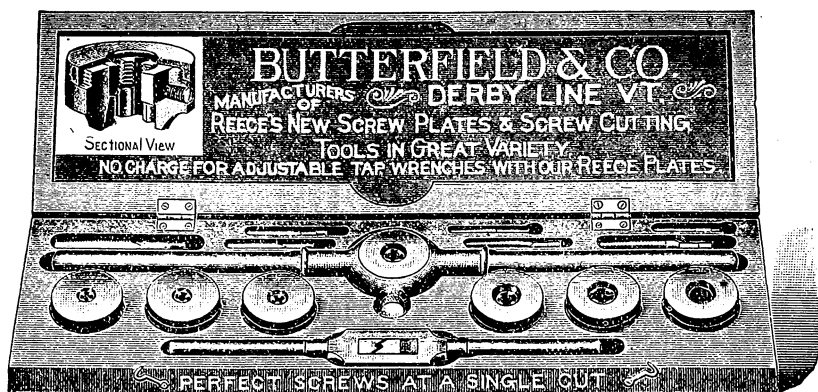
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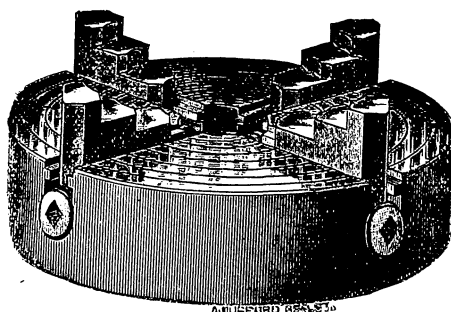
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Quick. Accurate. Durable.

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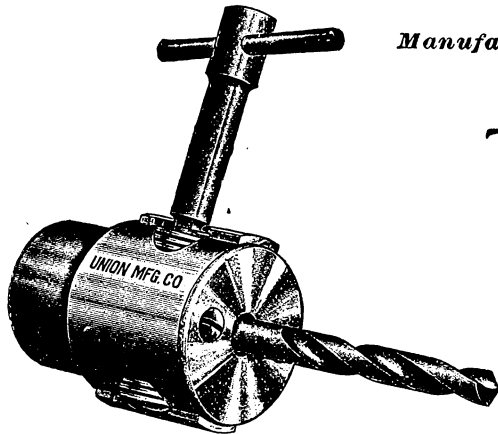


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WAREHOUSE, 103 CHAMBERS ST., NEW YORK.

Manufacturers of Combination, Universal, Independent, and Combination Reversible Jaw Chucks.



## THE UNION DRILL CHUCK.

| NUMBER. | DIAMETER.     | HOLDING.       | LIST.  |
|---------|---------------|----------------|--------|
| GOO     | 1 1/4 inches. | 0 to 1/4 inch. | \$7.00 |
| IOO     | 2 1/4 "       | 0 to 1/2 inch. | 8.00   |
| IOI     | 2 3/4 "       | 0 to 3/4 inch. | 9.00   |
| IO2     | 3 1/2 "       | 0 to 1 inch.   | 10.00  |

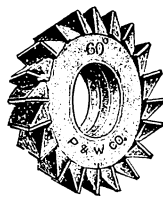
For description and price of the tools illustrated herein, also taps, dies, counterbores, holders with inserted cutters for turning, threading, forming and cutting off, ask for

Hardware Catalogue

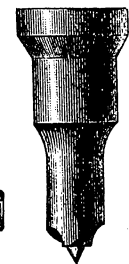
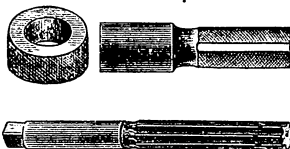
—OF—

**Pratt & Whitney Co.,**

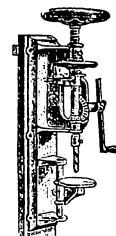
Hartford, Conn., U. S. A.,



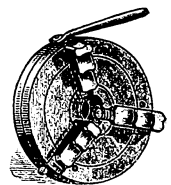
BIT BRACE COLLET and DIE.



SPIRAL SHEAR PUNCH.

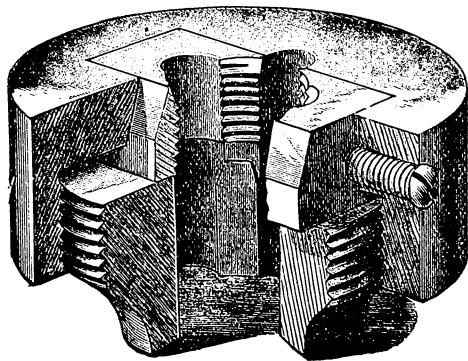


HAND DRILL.



COMBINATION LATHE CHUCK.

"LITTLE GIANT."



Patented February 3d, 1885.

SECTIONAL VIEW OF DIE AND COLLET.

**ADJUSTABLE DIE AND COLLET.**

To adjust simply turn screws at end of dies *in or out*, as the adjustment desired requires.

**SIMPLE, STRONG AND DURABLE.**

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In every assortment of our **NEW LITTLE GIANT SCREW PLATES** we put in our latest improvement in adjustable **TAP WRENCHES** at no extra expense to purchaser.

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New Little Giant Screw Plate with  
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Same list prices as heretofore.

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**Bit Stock Drills for Metal or Wood.**



**Wood-Boring Brace Drills, will cut off nails.**

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for Ratchets,  
Twist Drills for  
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Sockets for  
Taper Shank  
Drills.

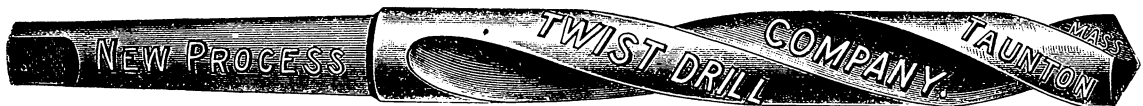
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They are TOUGHER, STRONGER, BETTER than is possible to attain by milling. Catalogue and Discounts sent on application.

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Invented and  
Manufactured by  
**THE**

**STOW MFG. CO.,**

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**PORTABLE  
DRILLING  
TAPPING.**

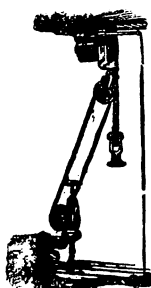
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**Thos. H. Dallett & Co.,**

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Electric Motors specially  
adapted for driving Ma-  
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vators, Pumps, Presses and  
other machinery.

Complete Power and Light  
Plants Installed.

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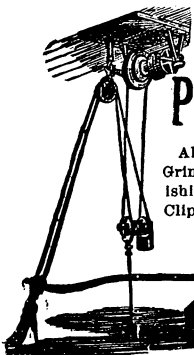
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Manufacturers of  
**PORTABLE DRILLING,  
TAPPING, REAMING  
and BORING MACHINES**

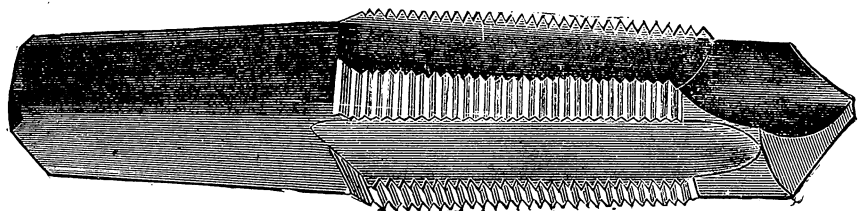
Also Tools for Emery Wheel  
Grinding, Metal and Wood Pol-  
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Gen'l European  
Agents.

Bolling & Lowe,  
2 Lawrence,  
Pountney Hill.  
LONDON, ENG.



## Morse Twist Drill & Machine Co., NEW BEDFORD, MASS.



The above cut shows a combined Tap and Drill and is used for tapping gas and water pipes.



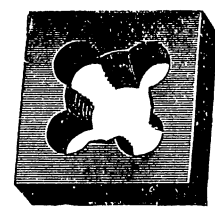
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We also do casting work on contract.

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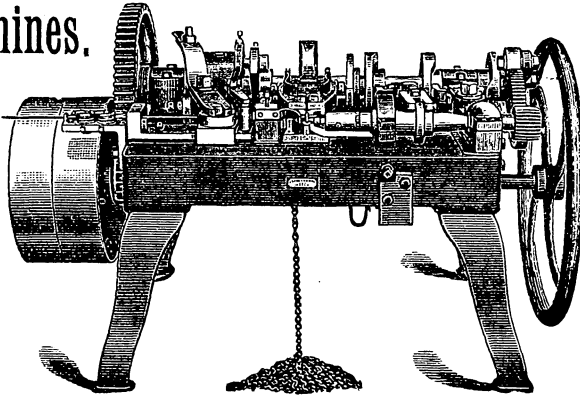
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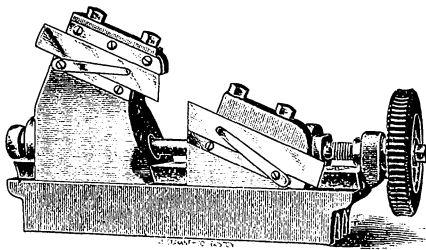
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CO.,  
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CUTTING-OFF MACHINES.

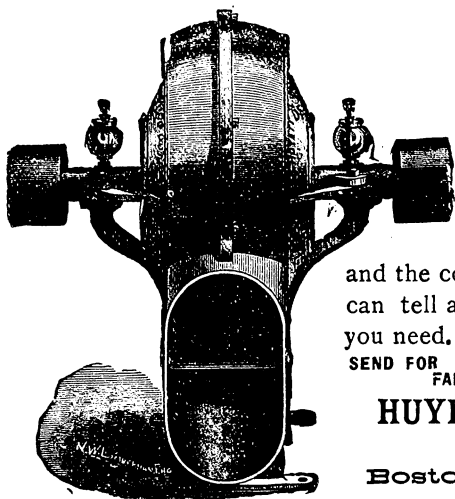
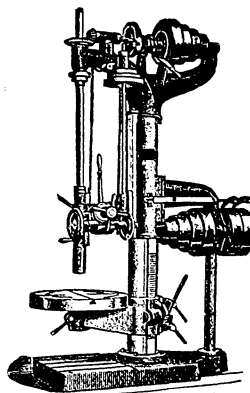
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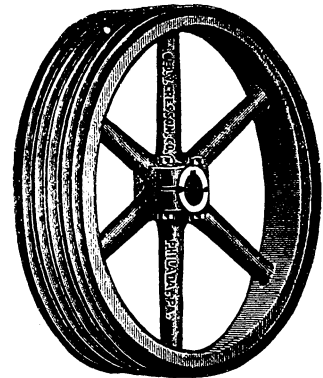
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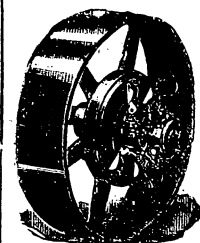
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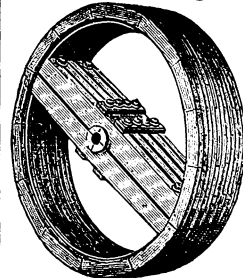


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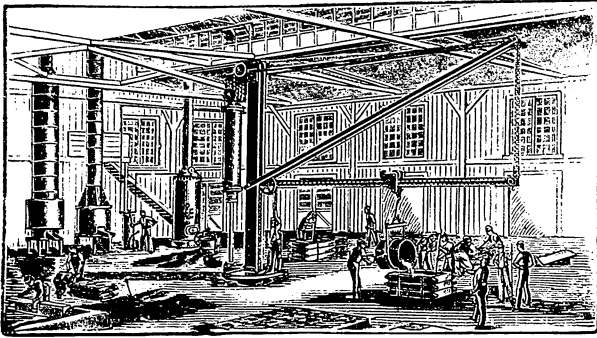


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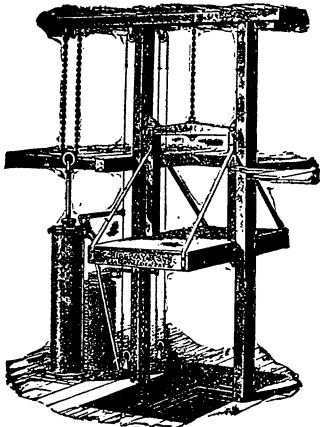
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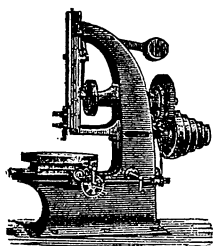
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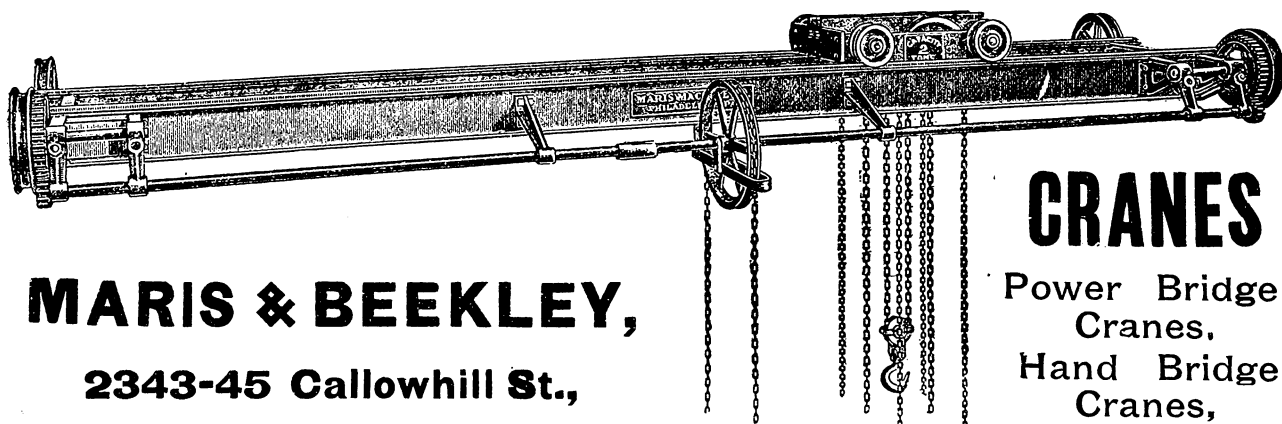
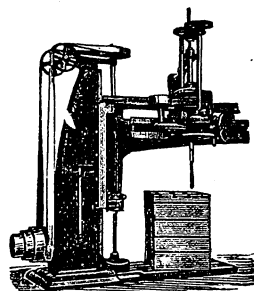


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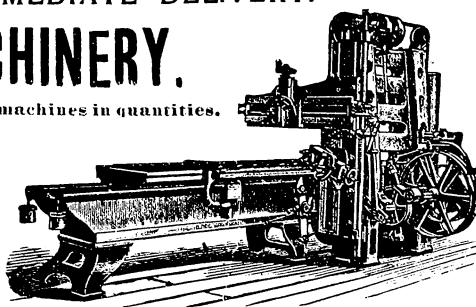
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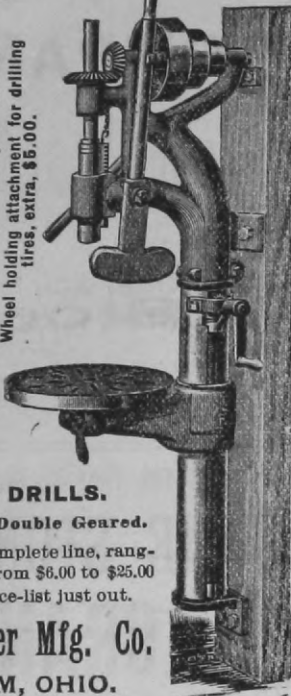
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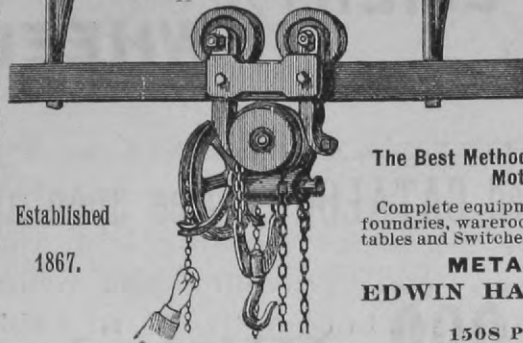
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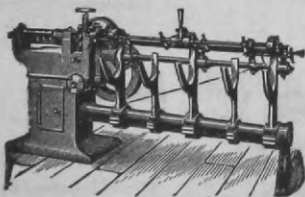
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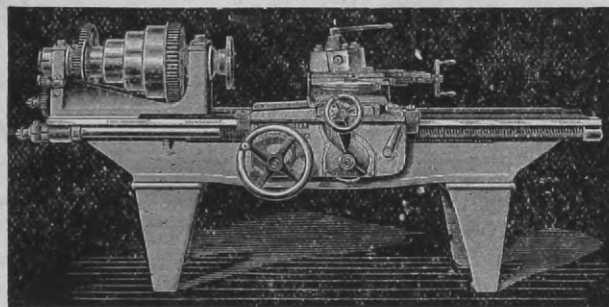
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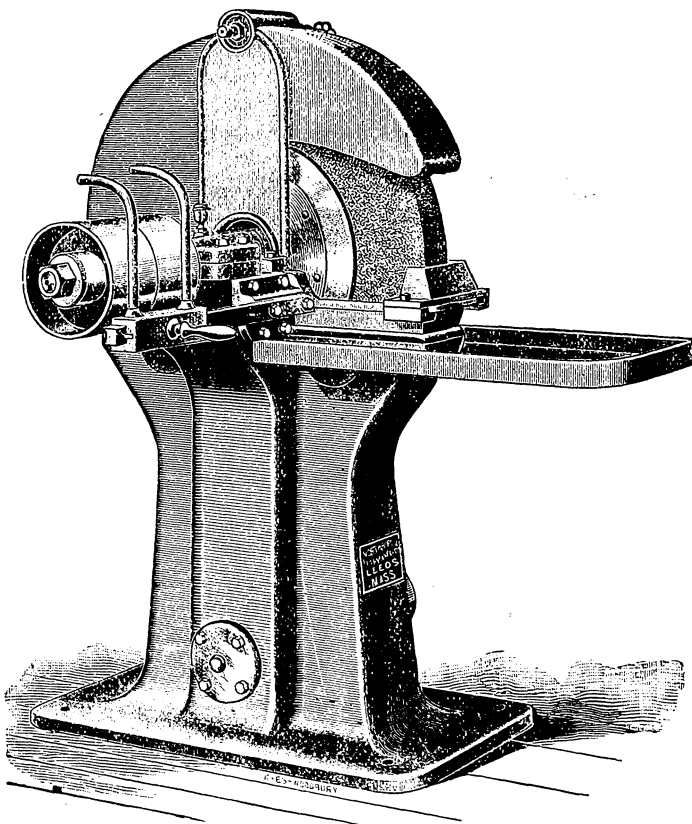
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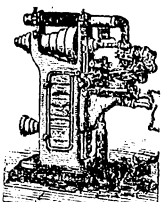
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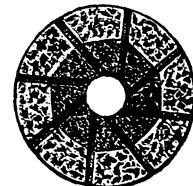
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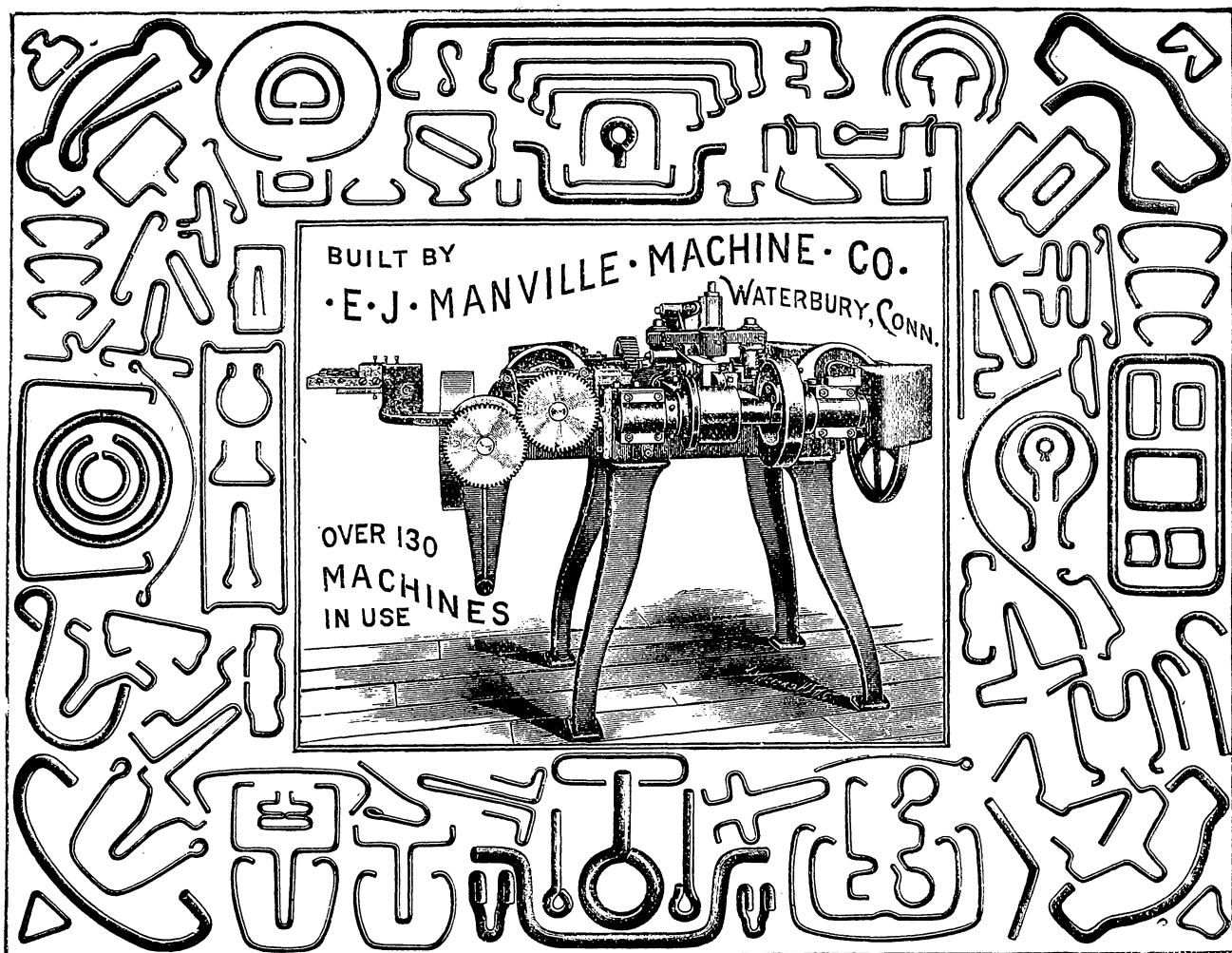
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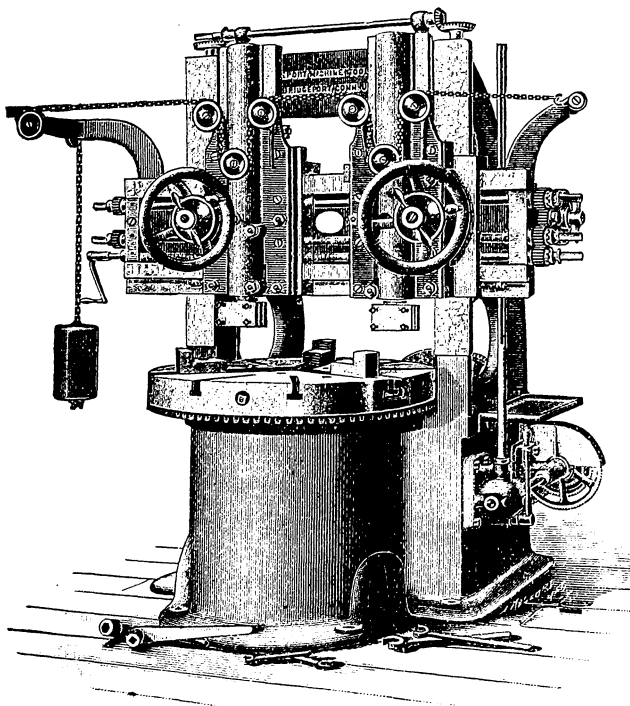
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Portable, Tubular and Vertical Boilers of all sizes.  
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TWO OF THEM; SECOND HAND.

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2 Double Deck Boilers about 40 H.-P. each, cheap. Hoisting Engine. Cylinder Boilers for Stacks, 30, 36 and 42 in. diameter. Round and Square Iron Tanks. Blow Offs. 5 Brass Cannons about 1400 or 1500 pounds each. Good order. All kinds of Scrap Iron and Metals on hand.

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16 x 24 " " " New.  
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One Fifield Screw Cutting Engine Lathe, 30 in. swing on 16 ft. bed, with blocks to raise same to swing 47 in.  
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2 Standard Gauge 8 wheel Passenger.  
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And many others.

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Engines, all sizes, Slide Valve and Automatic.  
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1 49 in. Gear Cutting Machine.  
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22 in. x 22 in. up to 120 in. x 120 in., ANY LENGTH.

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2 5 H.-P. Gas Engines. New.  
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 4 Brainerd No. 7 Millers, 2 with arm.  
 1 Brainerd Heavy No. 6 Lincoln Pattern Miller.  
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Cummers double Engine, 16 x 36. Band wheel 10 ft. 6 in. x 40 in. face. 80 ft. 4 in. Shafting. Five Clutch Pulleys, 48 in. dia., 14 in. face. Berryman Heater, 36 in. x 13 1/2 ft. high. 2 Kensington Heaters, 48 in. x 7 ft. high. 1 Berryman Heater and 1 Advance Heater for 300 H.P. Hydraulic Presses. Jacketed Kettles. 3, 10, 15 and 50 H.P. Engines and Boilers, Lathes, Tools, Vises, Belting. Address "GOLDEN," 1501 North 2d St., Philadelphia.

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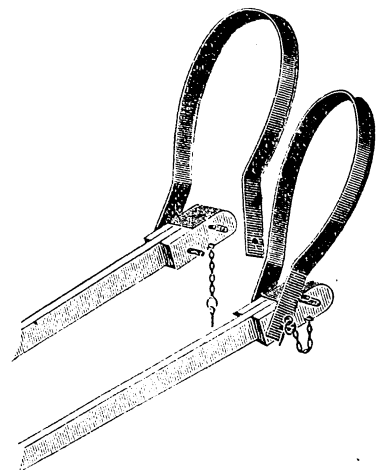
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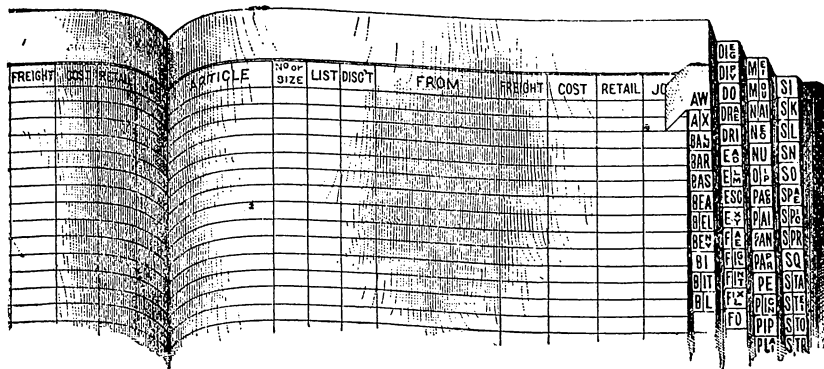
Containing Forty-Five Plates showing designs for houses of moderate cost, with descriptive letterpress, contributed by various architects, together with the following articles: "Suggestions on House Building." By ALBERT WINSLOW COBB, Architect; and "How to Plumb a Suburban House Safely, Economically and Effectively," together with Plans and Specifications. By LEONARD D. HOSFORD.

Cloth, 10 x 12 inches, \$2.00. — — — — — Paper, \$1.00.

The many attractive towns adjacent to our great cities illustrate the thought and skill that is now being brought to bear in regard to the planning and designing of our suburban homes. In preparing this book the object has been to present to the intending builder the necessary information and steps to follow so that the best results might be attained. The designs shown represent the efforts of nineteen architects who have made a special study of the subject. Each design is fully described and accompanied by elevations and plans. In many cases the cost given is the actual amount of contract. In others estimates and in some bills of material are given.

# The Iron Age Hardware Price Book F.

WITH MULTIPLE INDEX (Patent Pending).



AD DI<sub>1</sub> ME SI  
AN DI<sub>2</sub> MO SK  
AU DO NAI SL  
AW DR<sub>1</sub> NE SN  
AX DRI NU SO  
BA<sub>1</sub> E<sub>1</sub> O<sub>1</sub> SP<sub>1</sub>  
BAR E<sub>2</sub> PA<sub>1</sub> SP<sub>2</sub>  
BAS ESC PAI SPR

Fac-Simile of Indexing.

**SIZE.**—The book is 8 1/4 x 11 inches (much larger than Price Books A, B, C, D or E), 556 pages.  
**PAPER.**—The paper is the celebrated Crane's heavy ledger paper, tough and strong, permitting frequent changes and erasures.  
**BINDING.**—The binding is of the very best quality—flexible seal grained leather.  
**INDEX.**—By means of the arrangement shown in the cut the four rows of index applies to every page (except Supplement) and permits reference to any article at a single motion. This greatly facilitates the use of the book, avoiding the troublesome turning from page to page which is necessary in connection with other Price Books. It has been prepared with great care, and it is believed that it provides a place for every article in the Hardware line, and gives ample space for recording prices. Sufficient space has been provided for large lines of goods such as Axes, Bits, Springs, etc., by allowing four pages to such indices, instead of two pages, as for lines of goods requiring less space. This is accomplished, as in AX for example, in Book F by having a short tab with the letter A on the first leaf, and AX on the tab on the second leaf. The A on the first leaf is directly over the A on the lower leaf, so that the index reads AX whether looking at both leaves together, or at the lower one only. The four rows of index tabs are printed in gold letters on black Russia leather. The tabs are securely fastened on both sides of each page, making a handsome and durable index.  
**ARRANGEMENT.**—The book is arranged to keep a complete record of prices on a single page, the width giving sufficient room.  
**SUPPLEMENT.**—An 80-page Supplement is provided to give room for supplemental quotations, memoranda, tables, &c.

THIS BOOK IS ISSUED IN ONLY ONE EDITION, PRICE, \$7.50.

## Advantages of Multiple Index Price Book.

A SPECIAL feature of the books is the arrangement of the index characters, which, instead of being alphabetical, are arranged with special reference to the classification of Hardware goods, each index character giving the first two or three letters of the names of Hardware articles as shown above. The ease and convenience with which the books can be used is indicated in the following examples, taken from Book F:

|                 |         |                 |               |         |                 |                |         |                 |
|-----------------|---------|-----------------|---------------|---------|-----------------|----------------|---------|-----------------|
| For Augers,     | turn to | AU              | For Chisels,  | turn to | CH <sub>1</sub> | For Iron,      | turn to | IRO             |
| " Parers, Apple | "       | PA <sub>1</sub> | " Cutlery,    | "       | CUT             | " Irons,       | "       | IR'S            |
| " Saws,         | "       | SAW             | " Cartridges, | "       | CAR             | " Shovels,     | "       | SH <sub>1</sub> |
| " Pumps,        | "       | PUM             | " Rules,      | "       | RUP             | " Grindstones, | "       | GRI             |
| " Bits,         | "       | BIT             | " Locks,      | "       | LO              | " Stones,      | "       | STO             |

Special care has been taken to make the classification as indicated in the index correct and comprehensive, making provision for all Hardware articles and giving sufficient space for the keeping and recording of prices. It is thought that every strictly Hardware article has its first two or three letters given, thus permitting immediate reference to it by a single motion.

It is, however, obvious if any articles are not directly designated by the index characters, that the index, being alphabetical in its arrangement, indicates the place where quotations on such articles should be recorded. The supplement, however, may be found useful for quotations on any outside goods which the Hardwareman may desire to keep prices on, while at the same time it may be used if necessary for any overflow of matter from the preceding pages, or to contain list prices or other matter relating to goods.

**Hardware Classification.**—A pamphlet containing a classification of the leading Hardware articles is furnished with the price books. **Standard Lists.**—In connection with these price books a set of *The Iron Age* STANDARD HARDWARE LISTS can be used with great advantage. Price 25 cents.

These price books, which have been prepared by R. R. Williams, Hardware Editor of *The Iron Age*, are presented to the attention of Hardware men in the confidence that they will be found a most valuable aid in keeping track of prices.

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DAVID WILLIAMS, Publisher, - 96-102 Reade St., New York.

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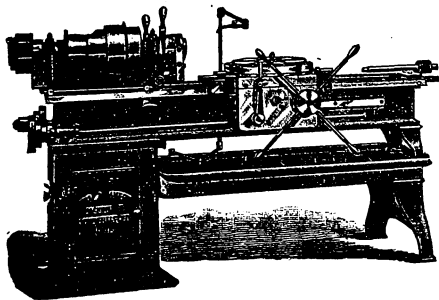
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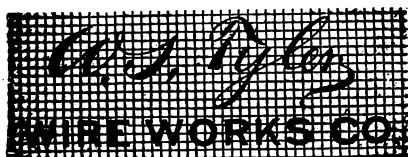
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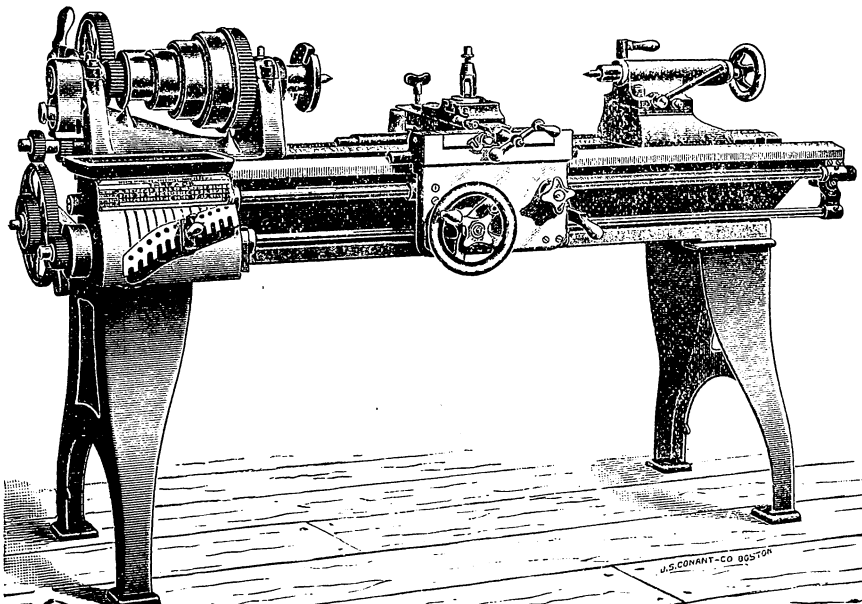
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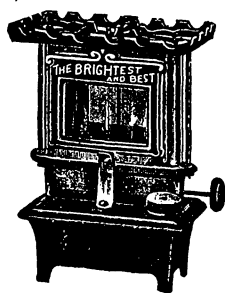
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Packed one dozen in box.  
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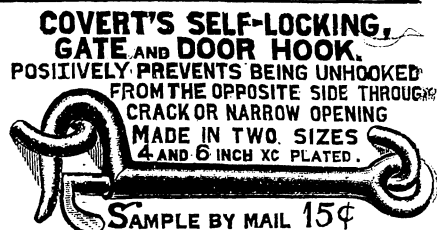


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SAMPLE BY MAIL 15¢

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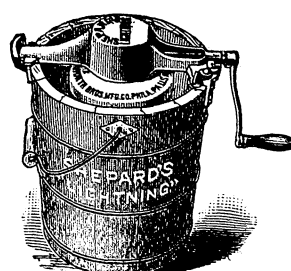
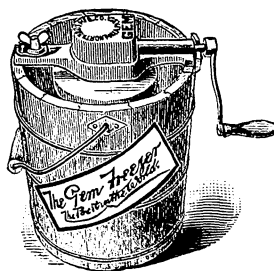
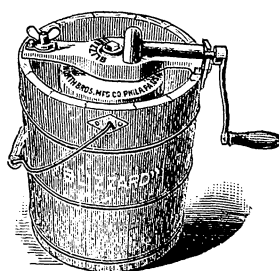
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**GUARANTEED NOT TO FALL OFF**

Pails are made of Best Virginia White Cedar,

The best wood known to man for resisting the action of water.

For Particulars, Prices and Discounts, Write



"Three of a Kind" in that they are all BETTER than "the Best" of other Makers.

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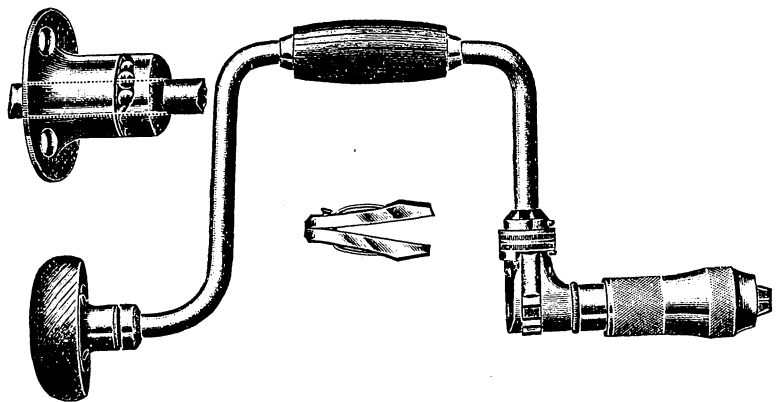


Single  
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Handle and Blade Formed in one piece.  
Always Clean. Indestructible.  
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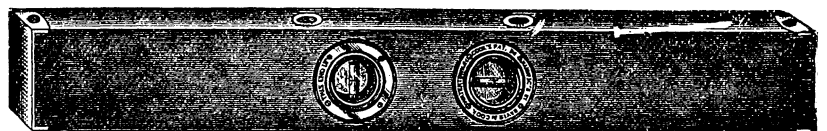
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Instead of reducing the price of our braces to meet competition, we have from time to time increased the cost of making the goods. Our latest improvement is the use of Ball Bearings, as seen in the cut. These balls prevent all wear, and cause the head to turn without friction. It is probably the best improvement which has been put on braces for many years. This has been the leading brace in market for a long time and we intend to make it worthy of its reputation for a long time to come. All Hardware Dealers will furnish them.

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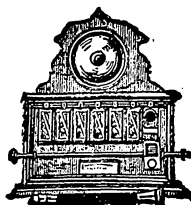
**COOK'S  
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Made in Wood and Iron. Every Level Fully Guaranteed.

Inquire at your nearest hardware store for them. If not in stock, send to

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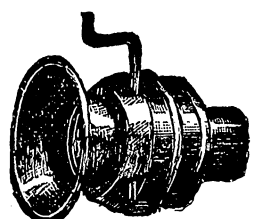


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A complete line of more than 1000 list numbers exclusive of our old  
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THE DEALER who sells what  
THE PEOPLE ask for.

MAKES FRIENDS and MONEY, and  
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And the people are right.

It is the strongest and best glue made. It has been  
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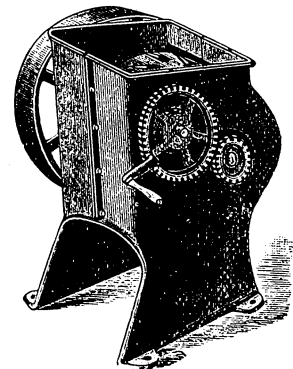
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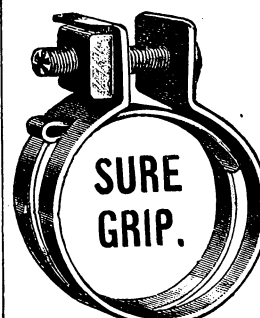
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REDFIELD'S  
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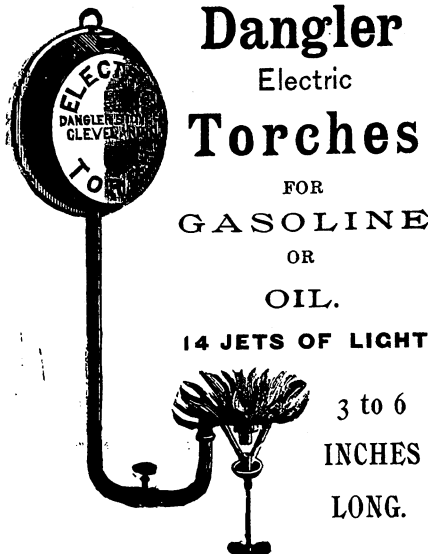
STRONGER,  
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And more pliable  
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Perfect Inner Circle  
Will not break.

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FOR  
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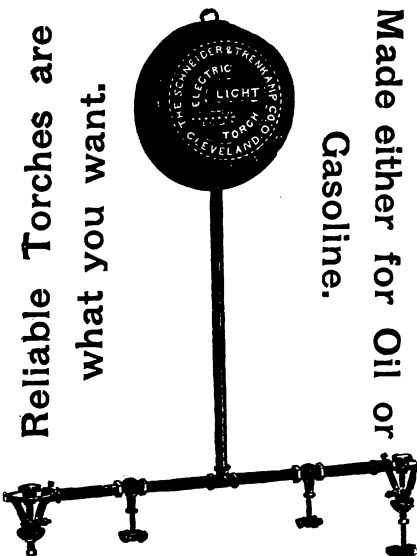
14 JETS OF LIGHT

3 to 6  
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LONG.

FOR lighting manufacturing establishments, such as Rolling Mills, Foundries, Machine Shops, Engine Rooms, &c., &c., with a convenient, portable, brilliant, steady light, and by cheaper means than by Coal Gas.

SOLE MANUFACTURERS,

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These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner.

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## ACME CUTTING TOOLS.

Made in all Sizes.



SOLID STEEL ACME PLIER  
AND WIRE CUTTER.

Made with cutters of best steel.

Jaws of choicest Tool Steel, dovetailed into the head, making it as strong as solid steel.

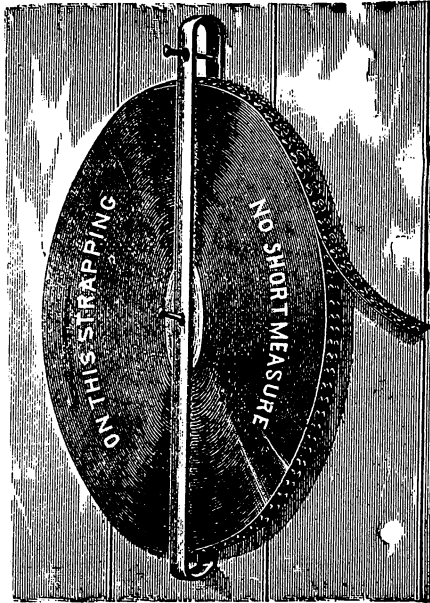


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**HIGGANUM HARDWARE CO., HIGGANUM, CONN.**

New York Office, 18 CHURCH Street.

PATENTED IN ALL COUNTRIES.



SHOWING REEL HUNG UP READY FOR USE.

**SIX PATENTS**

DATED: MAY 14TH, 1889; NOV. 25TH, 1890.

## Injunction Notice.

The U. S. Court says in its Decision:

*The defendant admits making and selling Box Straps which clearly contain CARY'S PATENTED INVENTION, although the "Bosses" are shaped differently than those shown in the drawings. "Injunction granted."*

All Goods put up in this style to be genuine must bear the name of the **CARY MANUFACTURING CO.,** stamped on each reel.

**Cary Manufacturing Co.,**

5 to 9 Elm Street, NEW YORK.

## LIGHT YOUR DARK SHOPS CHEAPLY.

Give your men plenty of Light and they will do double work.

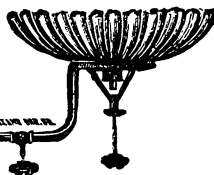


The Wall Torch has been used for several years as a means of illumination in Mills, Foundries, Machine and Car Shops, Tunnels, Street Stands, Band Stands, Smith Shops, etc.

While there are many cheap, inferior torches made which injure the sale of a good article, and condemn the Torch in general, our "Incandescent" Wall Torches are recognized as the best, and are now in use in the largest manufacturing establishments in the country giving **PERFECT SATISFACTION**, as is evidenced by the **DUPLICATE ORDERS** we receive from year to year.

They burn 150° Coal Oil, or 74° Naphtha, requiring a different burner for each.

In ordering be careful to state which is desired.



Price, for Single Torch, complete, \$2 each.

SPECIAL PRICE QUOTED FOR QUANTITIES.

**THE STANDARD LIGHTING CO.,**

100 to 118 Perkins Ave.,

Cleveland, Ohio,



These Instruments are a necessity to EVERY FARMER. They save enough Sows and Pigs every season, and on every Farm where Pigs are raised this Tool is indispensable. **SELL AT SIGHT** where seen by any practical Farmer. Dealers not acquainted with them should write the manufacturers. Reimers pays the freight on half-dozen orders or over. **J. N. REIMERS, Davenport, Ia.**



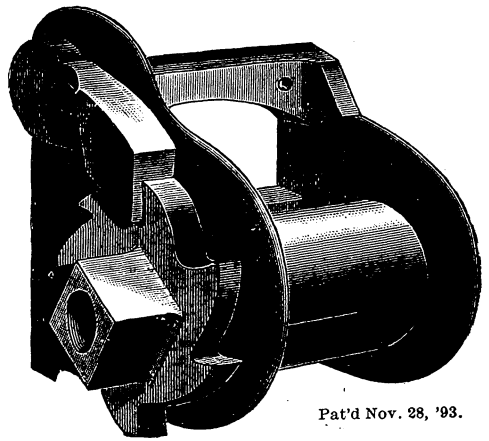
The large engraving illustrates clearly the many advantages of this device where fencing is erected upon irregular surfaces.

## THE I. X. L. Wire Fence Roller Staple.

The advantages of this device are that any kind of Barb or Plain Wire may be used for fencing in connection with it. The barbs passing freely under or over the revolving roller, at the same time provision is made for taking up the tension along the entire length of fencing, not between two posts only as is the case ordinarily. It is the simplest and most practical device ever offered for the purpose. The point of the wire loop is first driven into the post, then the wire stretched and the roller placed in position below or above the strands as shown in large engraving. The wire spike is then driven through the roller into post. Ask your nearest jobber for it or write for trade discounts and circulars to

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SOLE MANUFACTURERS,  
**CINCINNATI, O.**

**O. P. SCHRIVER & CO.,**  
Cor. Pearl and Sycamore Sts.,  
CINCINNATI, O.,  
Manufacturers of



Pat'd Nov. 28, '93.

## THE I. X. L. Wire Fence Ratchet or Tightener.

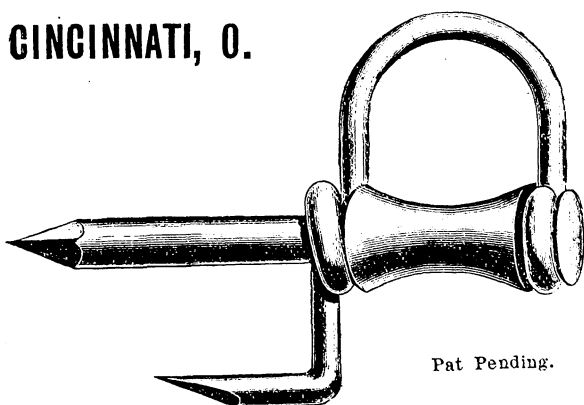
The Best Fence Ratchet in Existence.

This Ratchet is put on the end posts of each 50 or 60 rod stretch of any make of Fence Wire, and is the simplest device ever offered to draw and keep the wire perfectly tight. The wire can be stretched at any time by turning the square part on the Ratchet with an ordinary wrench, thus providing for absolute control of the Fence, keeping it from sagging, breaking or becoming unsightly.

To overcome the contraction of wire during cold weather, the Pawl can be easily thrown back thereby releasing the tension and prevent breaking of wire.

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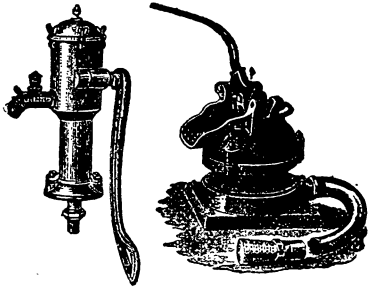
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Fig. 209.

Fig. 381.

Fig. 145.



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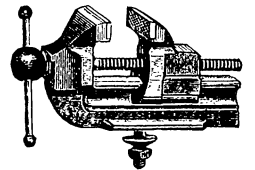
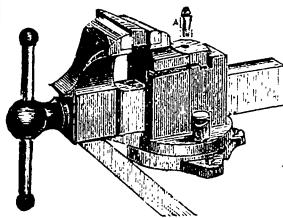
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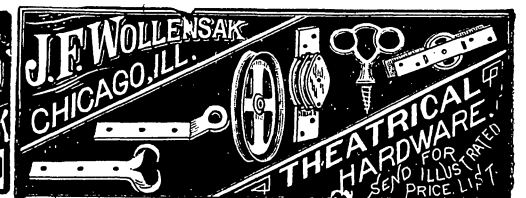
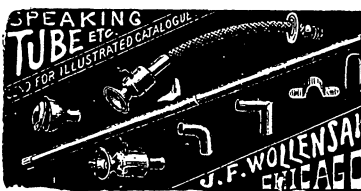
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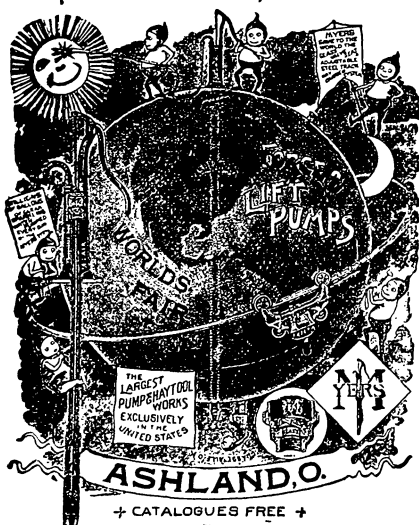
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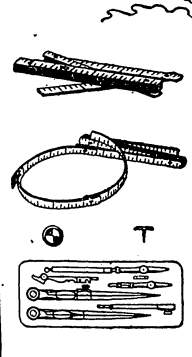
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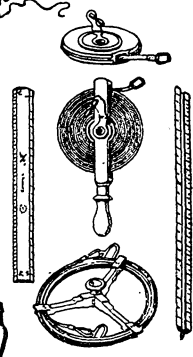
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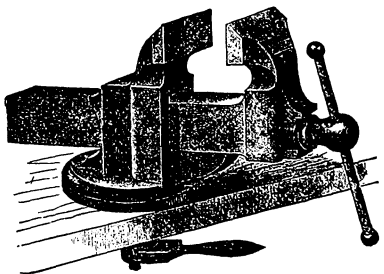
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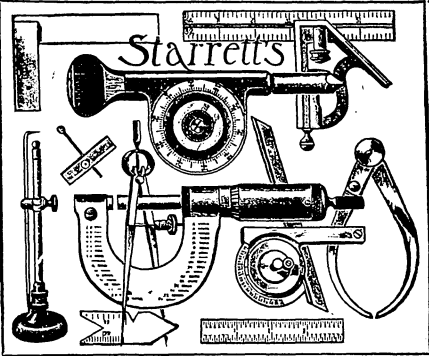


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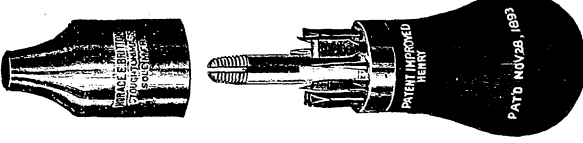


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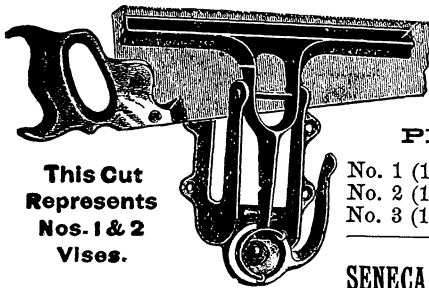
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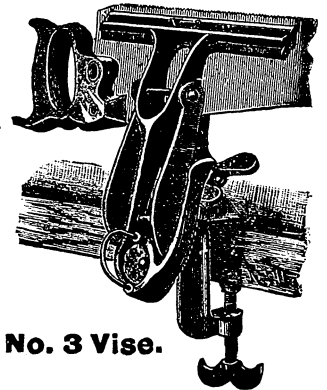
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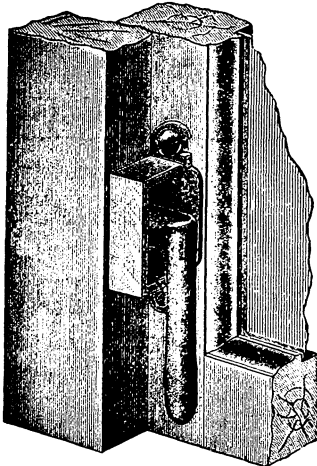
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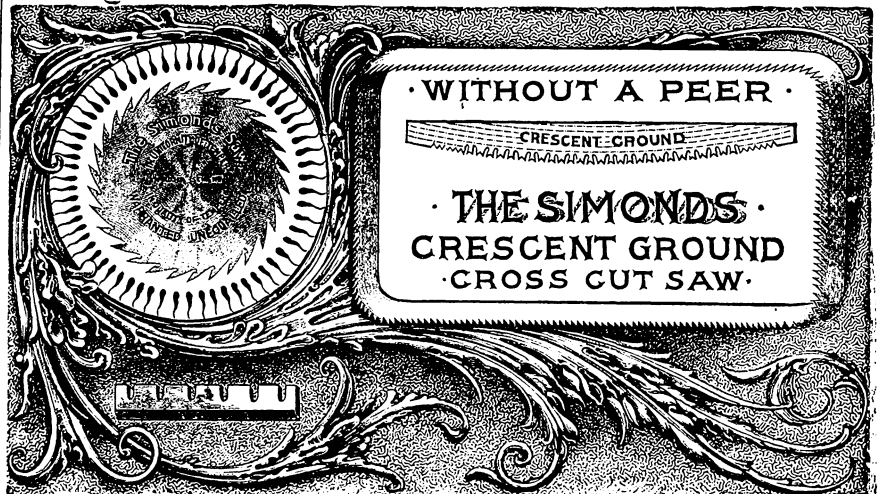
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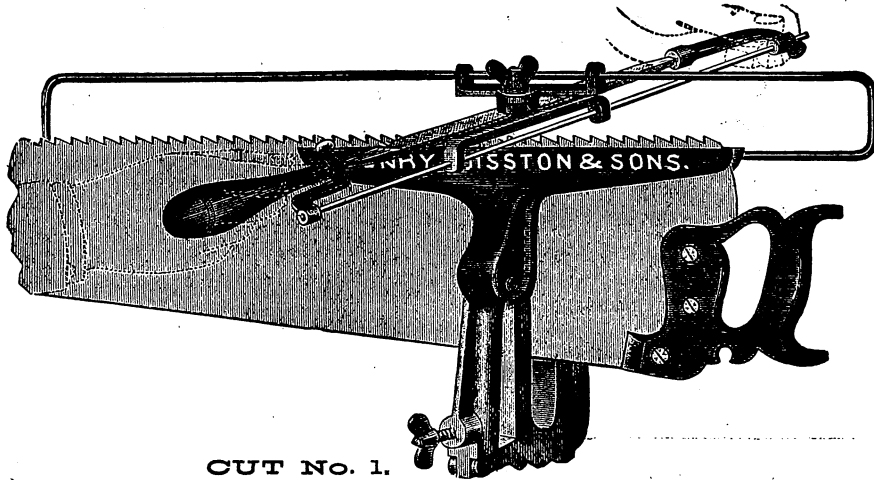
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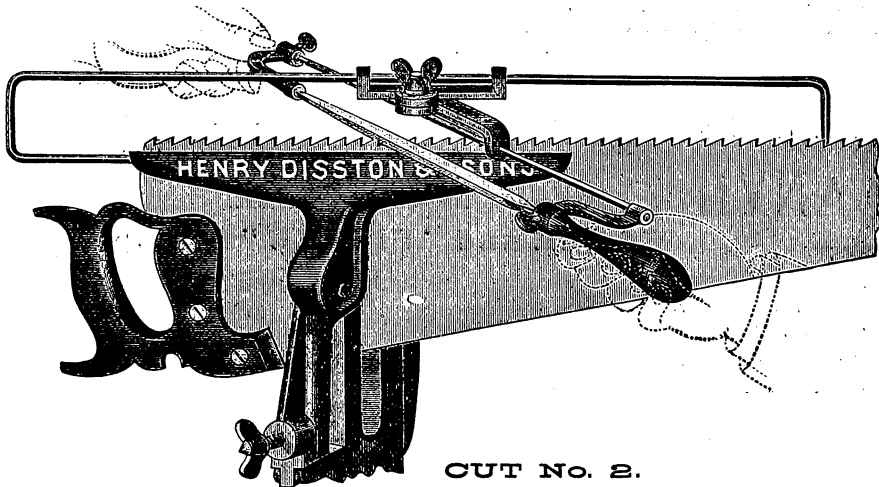
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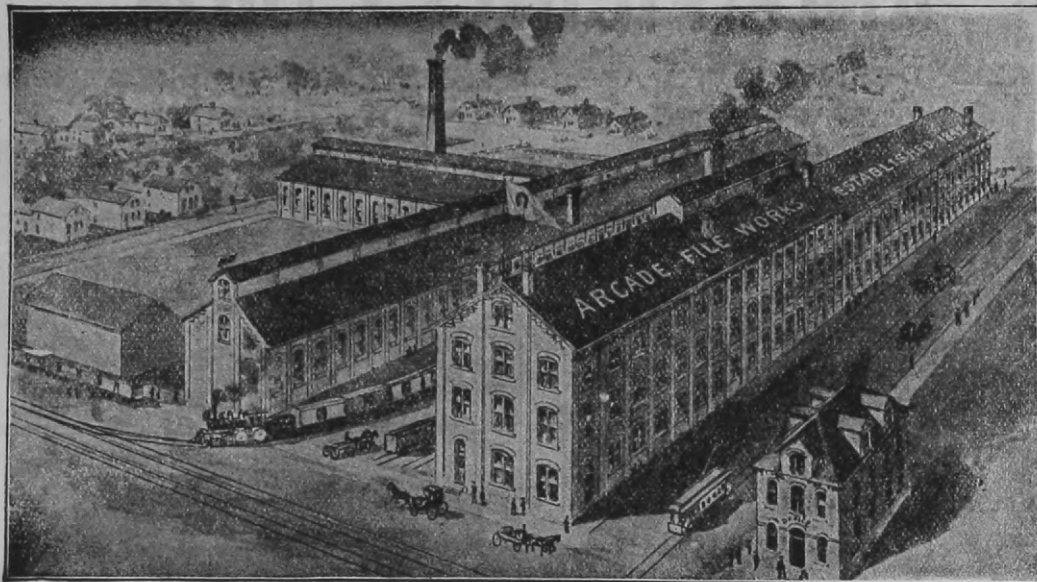
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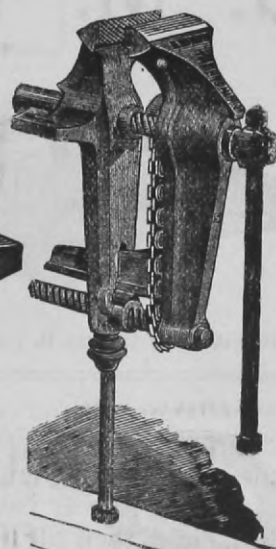
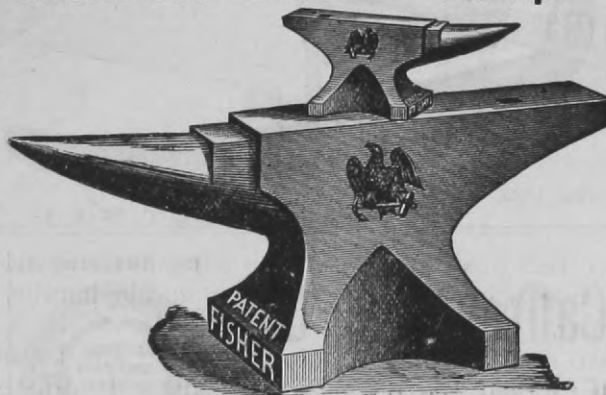
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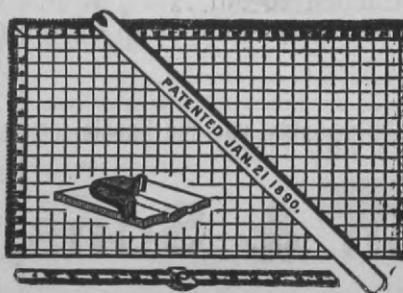
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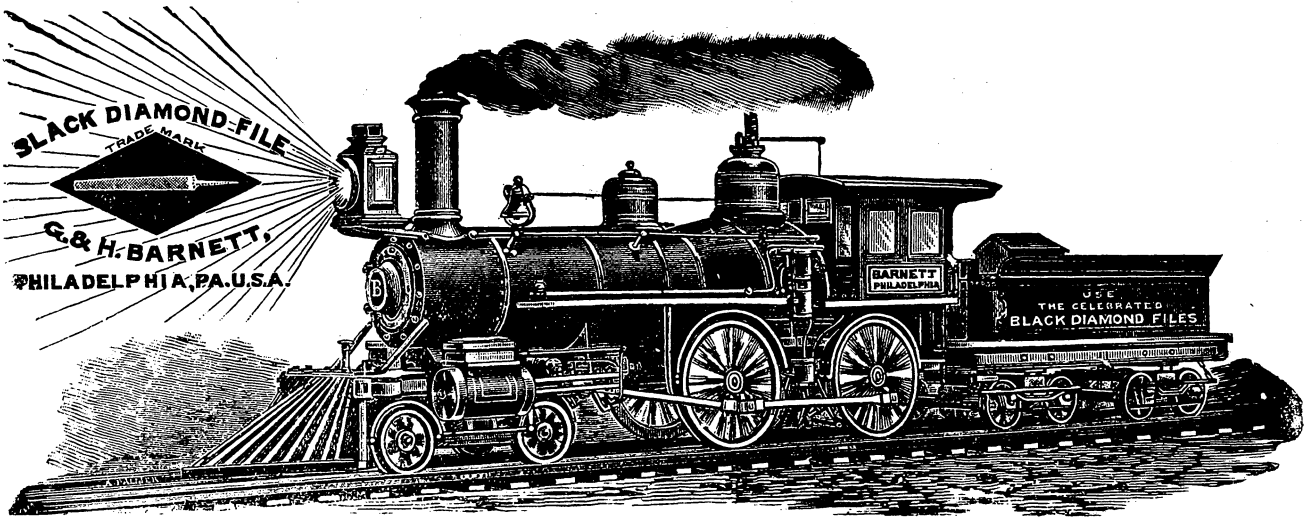
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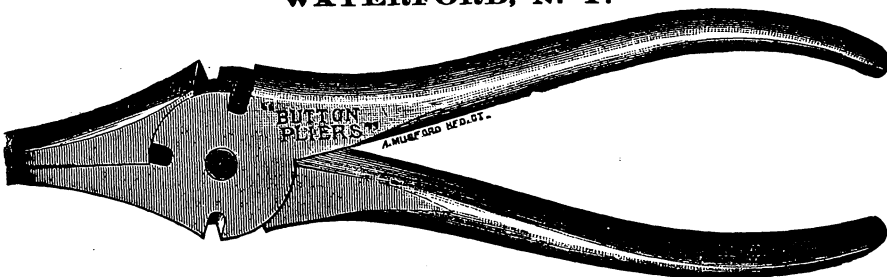
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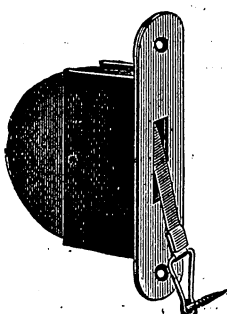
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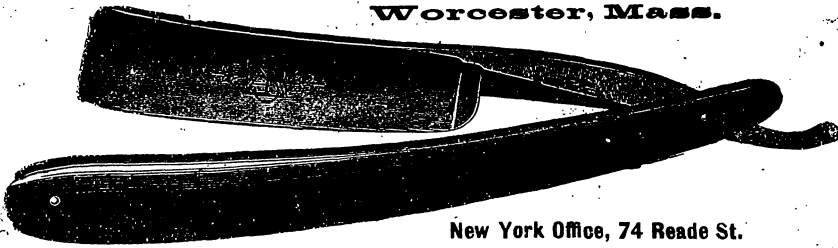
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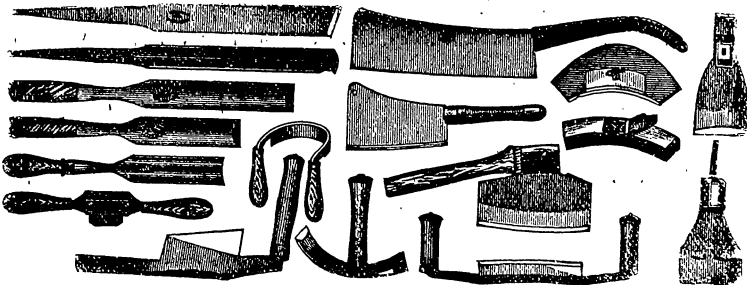


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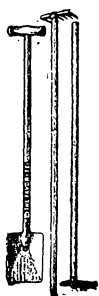
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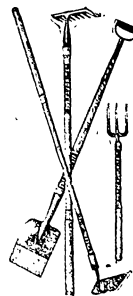
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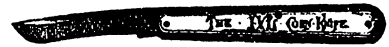
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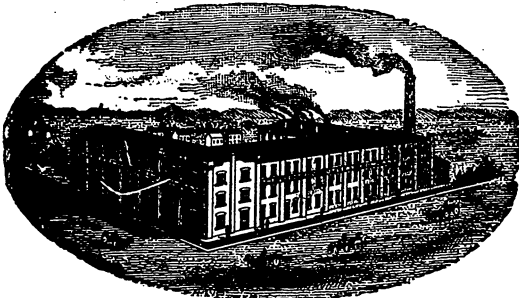


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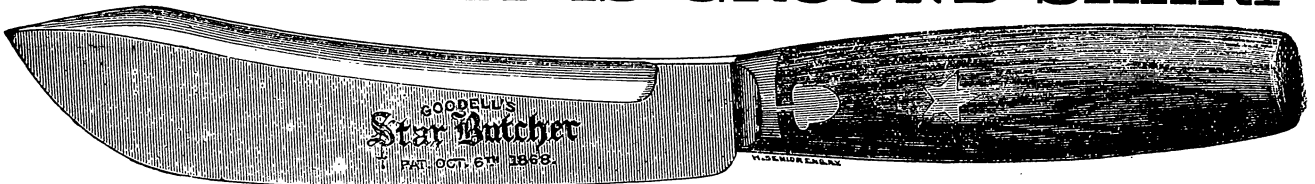
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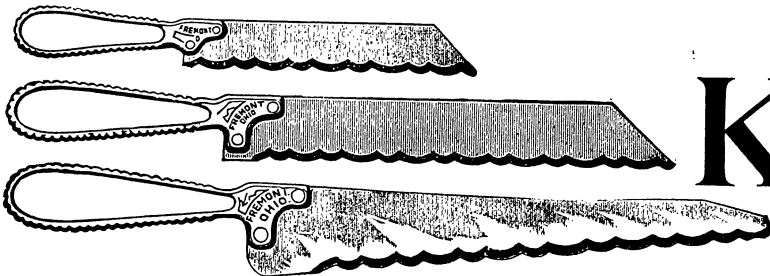
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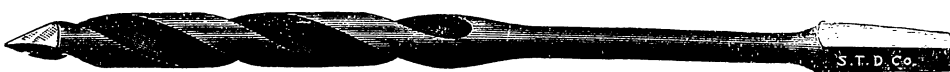
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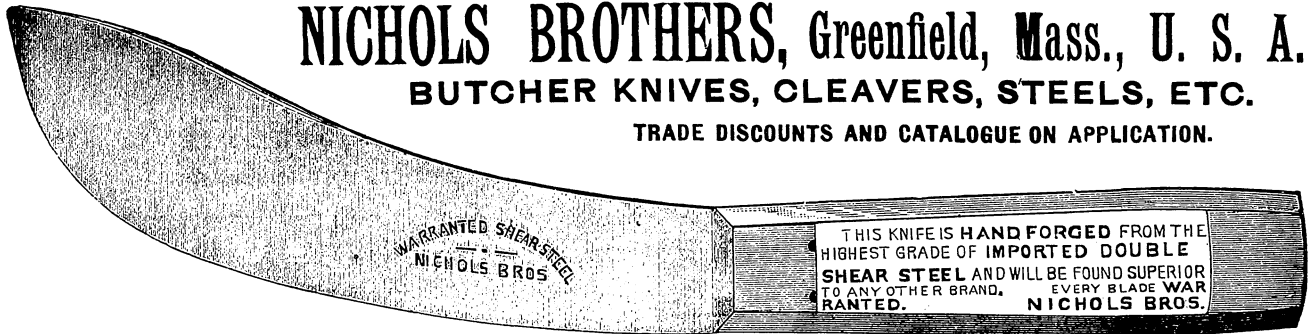
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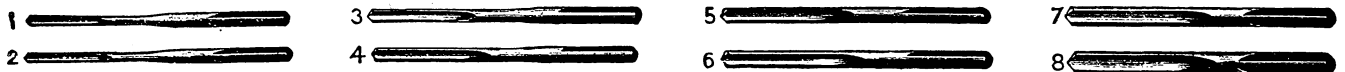


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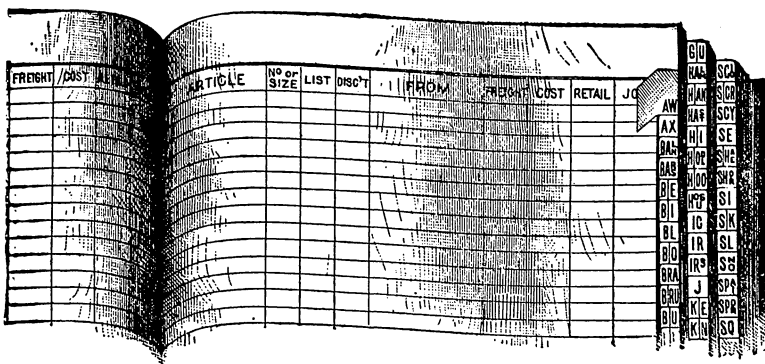
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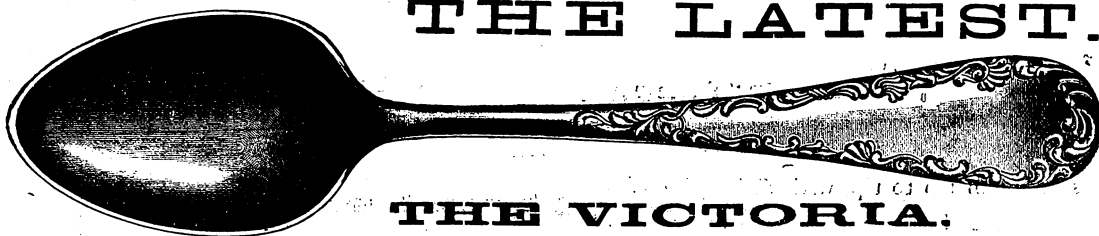
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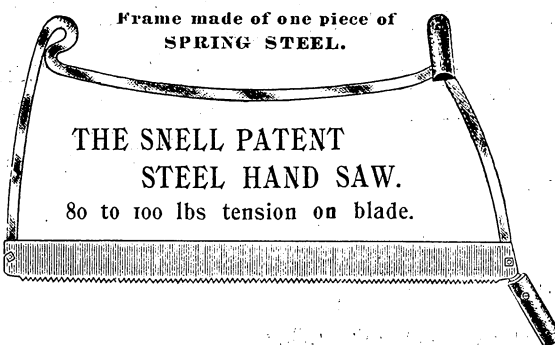
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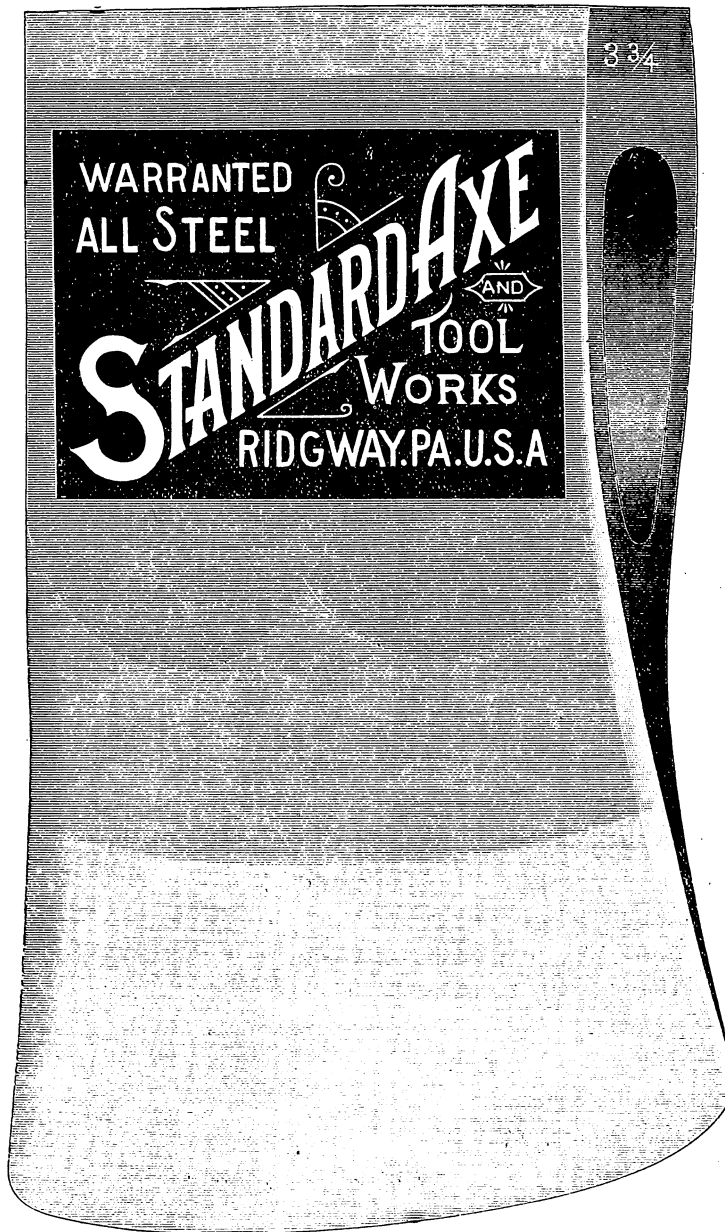


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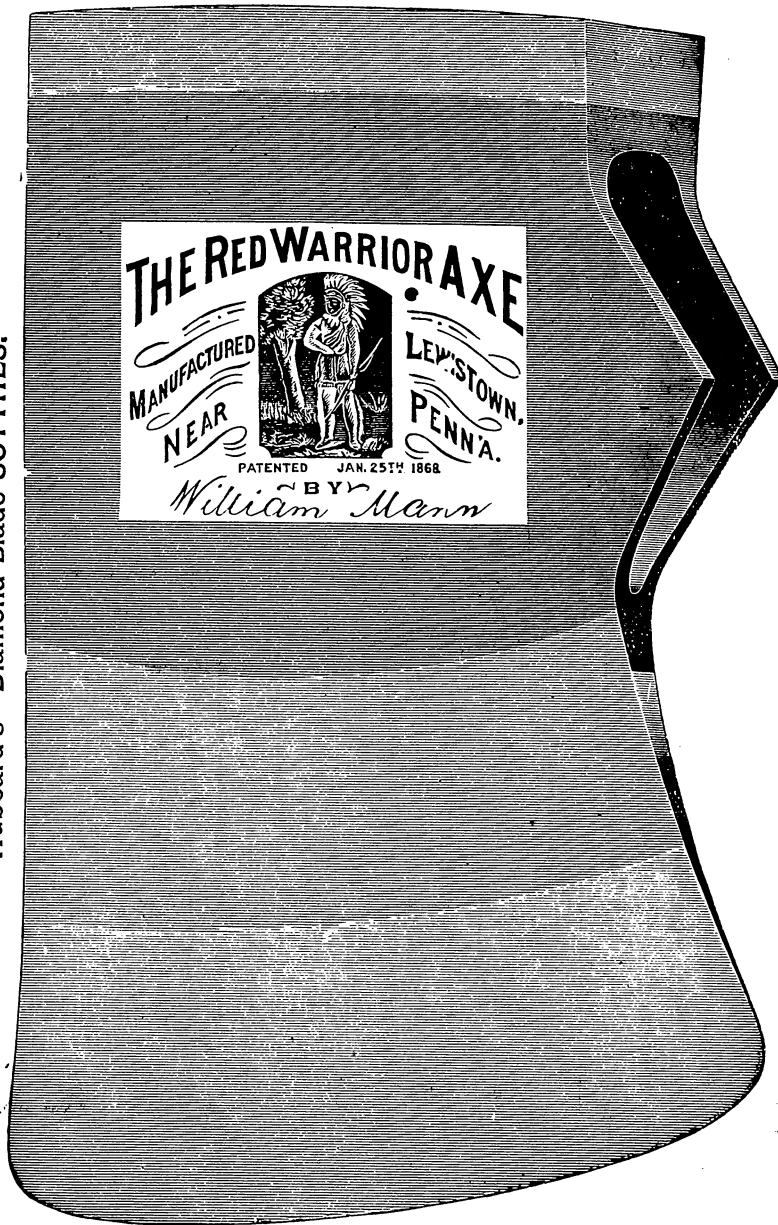
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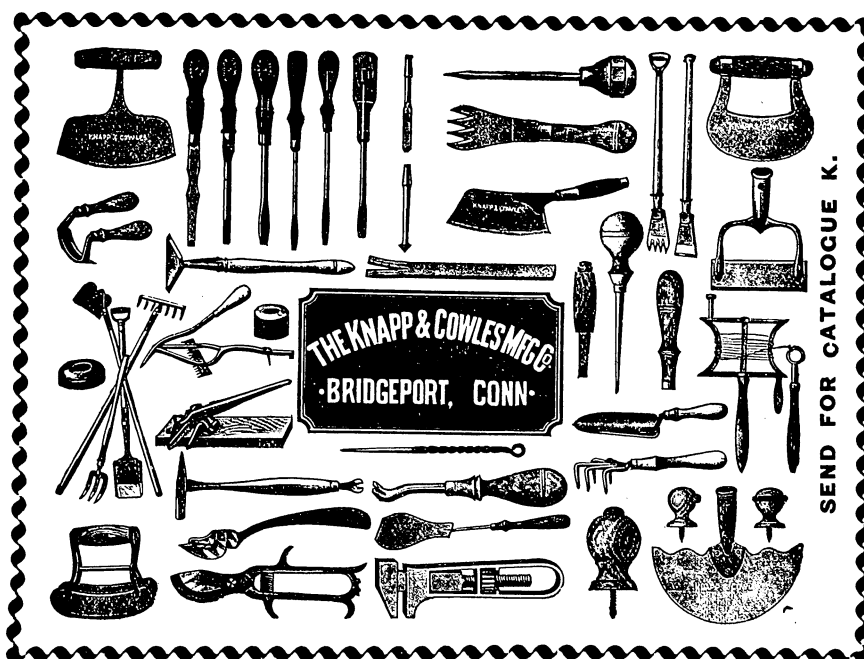
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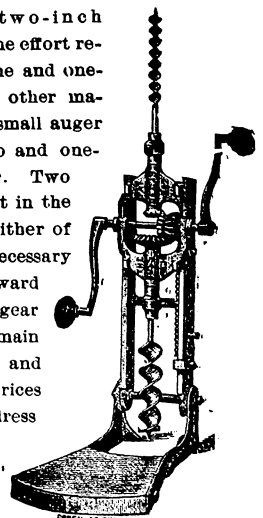
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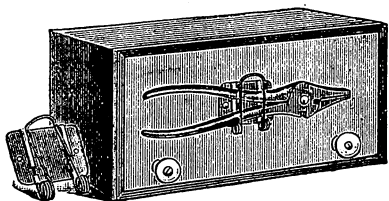
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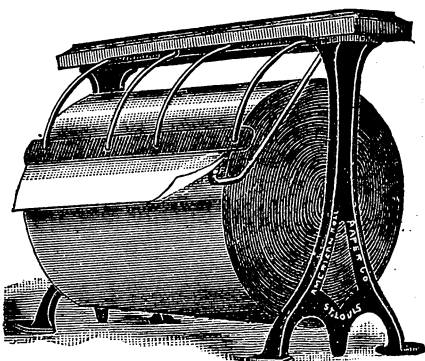
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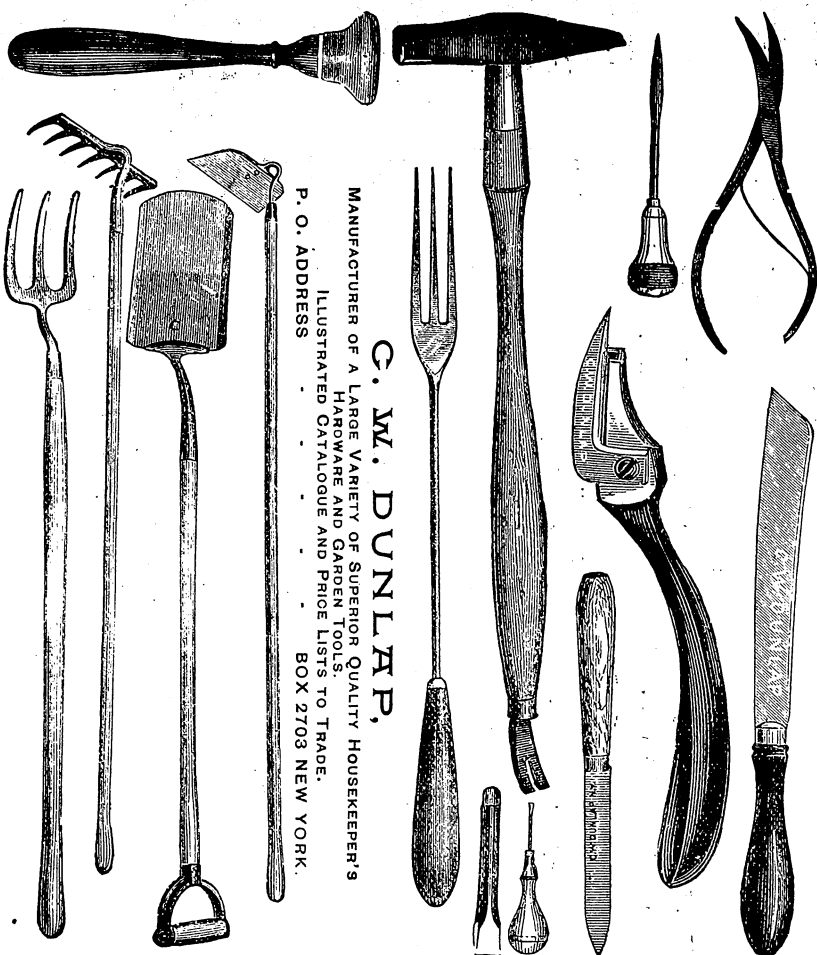
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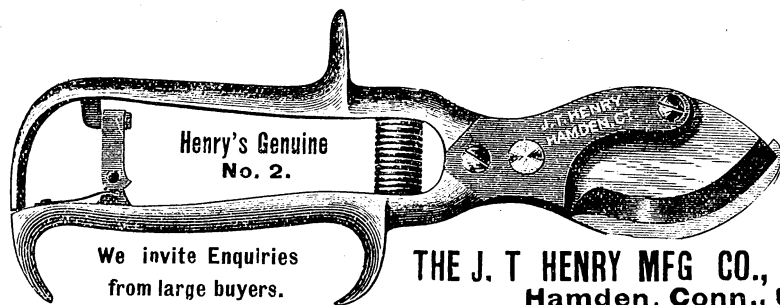
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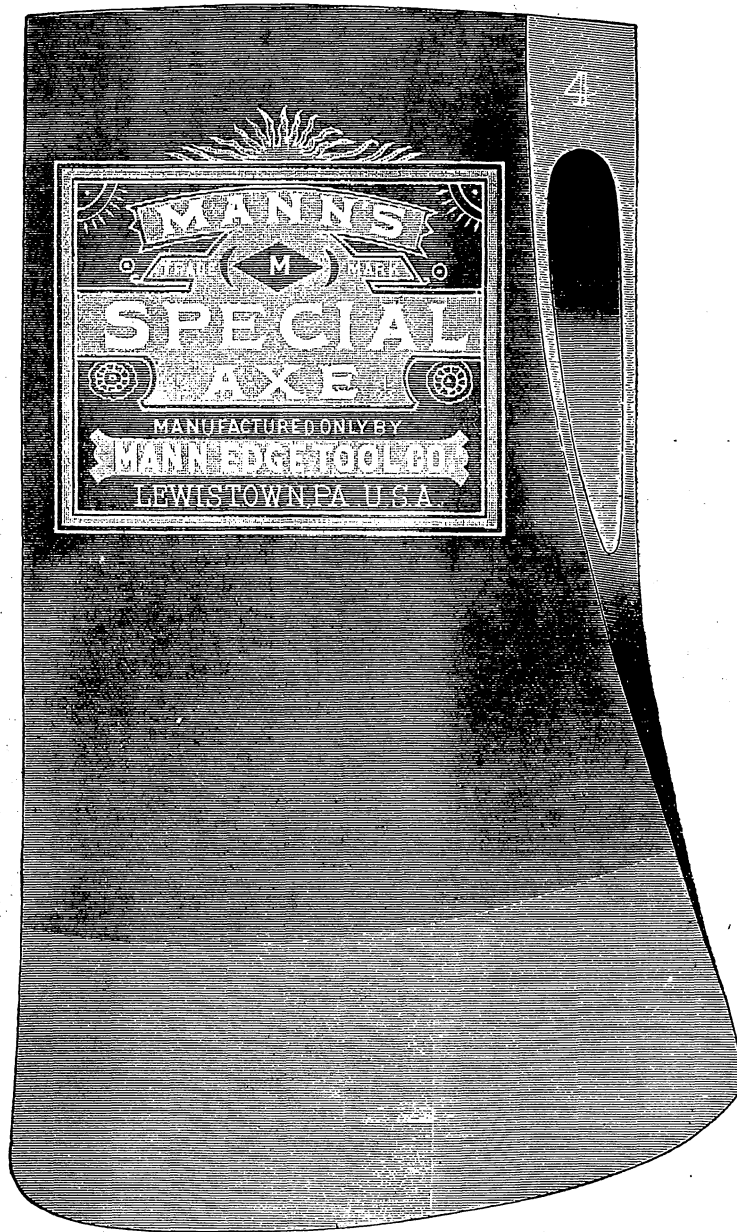
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# IMPROVED EDITION OF THE IRON AGE HARDWARE PRICE BOOKS.

Arranged by R. R. WILLIAMS, Hardware Editor of the Iron Age.

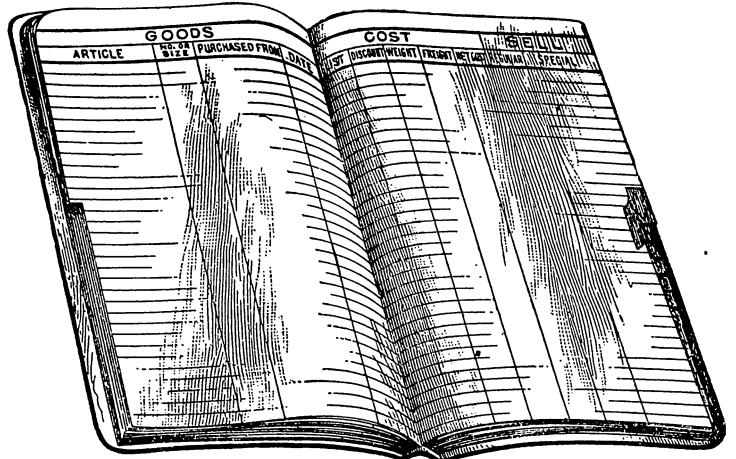
These Books are printed on paper of superior quality and bound in grain seal leather.

Columns are provided for the name and number or size, for noting from whom purchased, date of quotation or purchase, list and discount, and for entering freight expenses as an element of cost. Under the heading of selling prices, the regular and any special price, or remarks in regard to the goods are given place. This book goes into considerable detail in describing the goods and cost prices. It has been arranged in accordance with the views of many Hardwaremen whose methods are careful and exact.

Size, 4 x 7 in.; grain seal leather.

## FOUR EDITIONS:

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| A F, 200 pages with flap,   | - | - | - | - | - | 1.25   |
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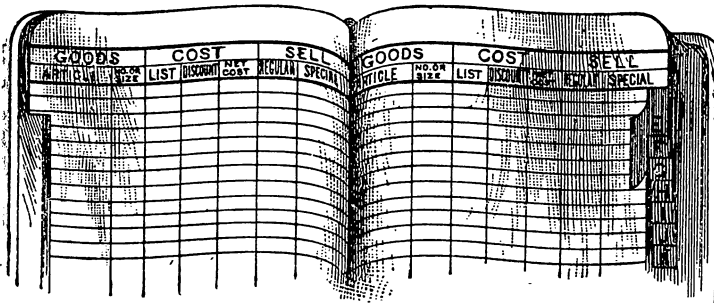
Hardware Price Book A.

In this book each page is complete, and the record of prices does not, as in Book A, run across two pages. Thus it accommodates a larger range of goods with much less detail in the record. It is adapted for office or store use, and by the use of familiar abbreviations, sufficiently large for the convenient and concise record of prices.

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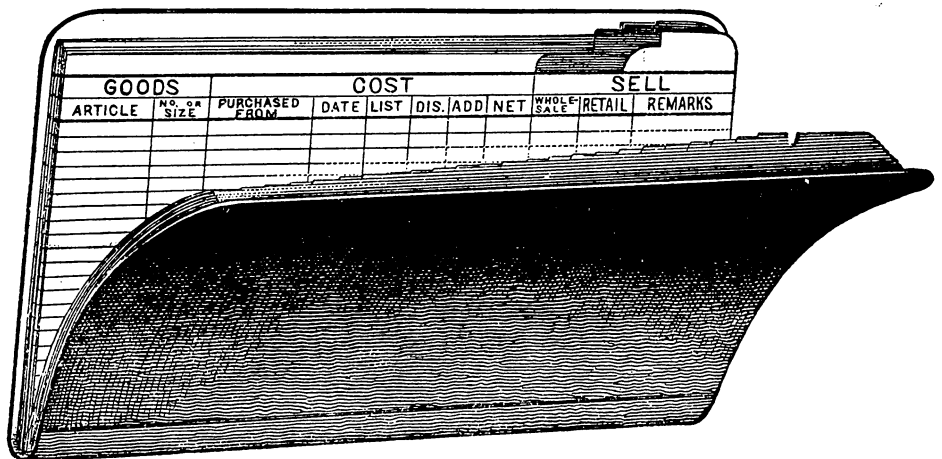
Hardware Price Book B.

The headings in Book C run across the top, in a line parallel with the hinge. In this way a very complete record can be kept on a single page. The details of weight and freight contained in Book A are omitted, and a single column headed "Add" given for the insertion of freight or other expenses which it is desirable to include in the cost. Under the selling prices space is left for the wholesale price, the retail price, and also for any remarks in regard to cost of the goods, desirability of pushing them, or other matters.

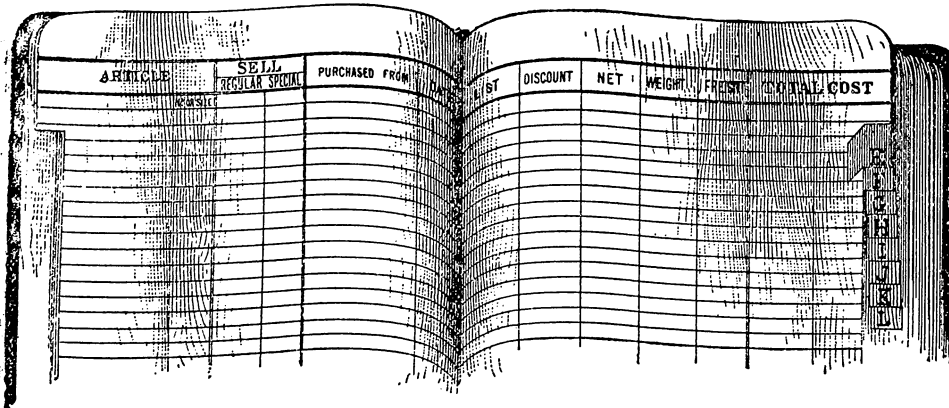
Size, 4 1/4 x 7 1/4 in.; grain seal leather.

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Hardware Price Book C.



Hardware Price Book D.

arrangement is adapted to the requirements of the trade in this direction.

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Price Book D will recommend itself particularly for desk and store use, and for salesmen on the road.

The name of the article, its number or size and the selling price are the first to meet the eye on the left-hand page, as embodying information desired when the selling price is required. The other headings follow in convenient order, by which a detailed memorandum regarding the goods may be kept, the whole being seen at a glance. A number of pages at the back of the book are arranged for memoranda, which will be found a great convenience. This arrangement is adapted to the requirements of the trade in this direction.



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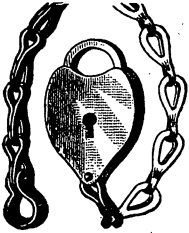
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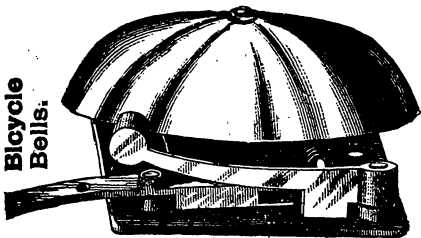


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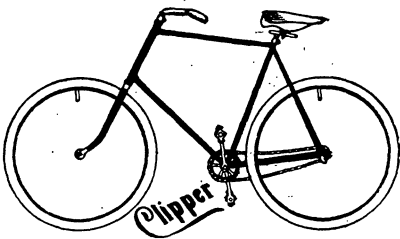
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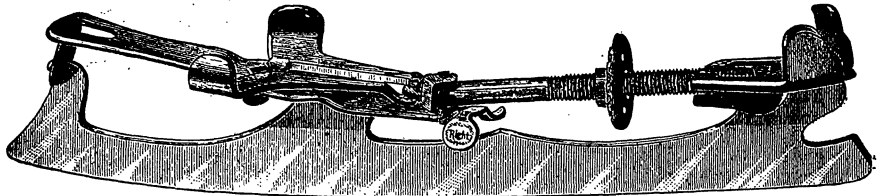
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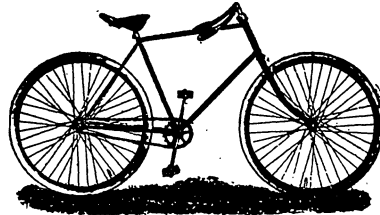


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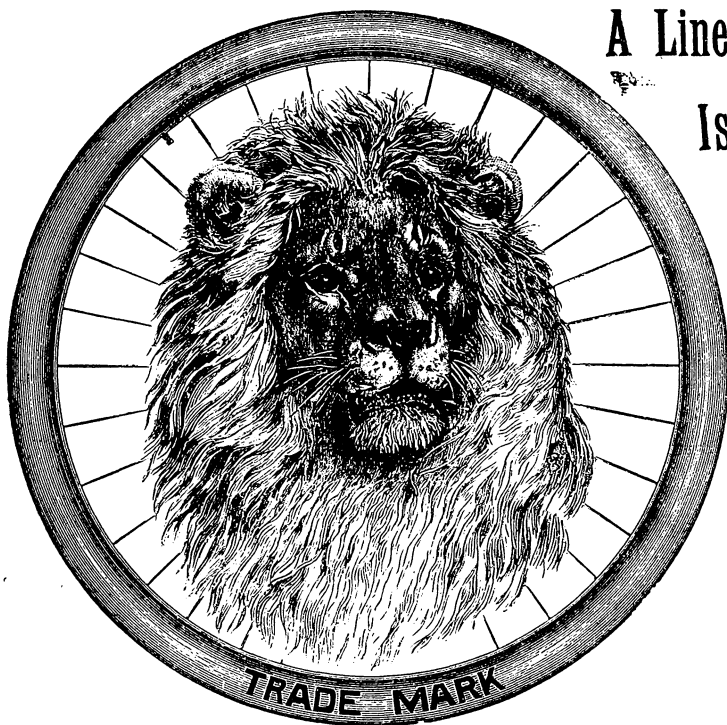
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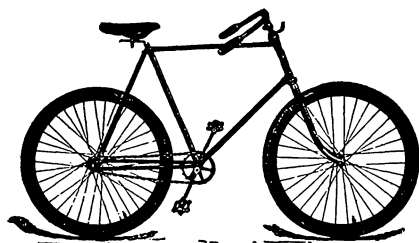
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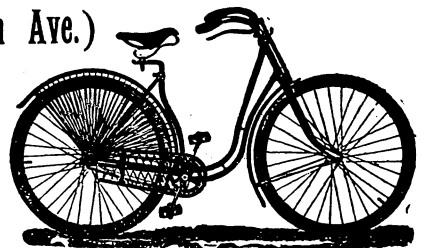
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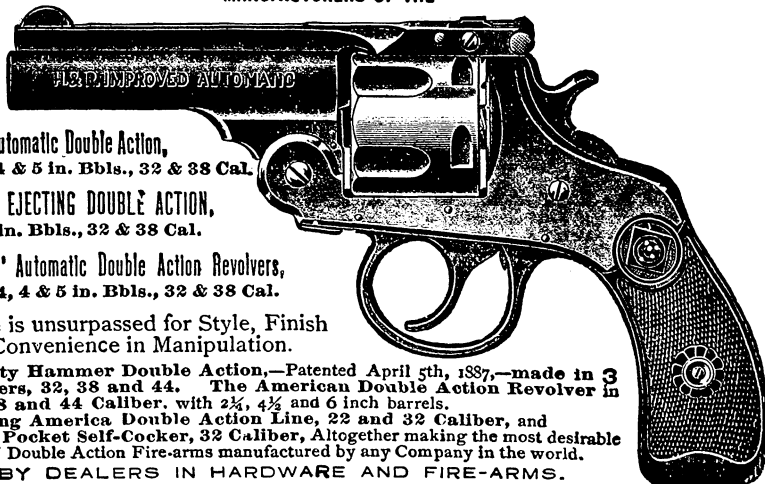
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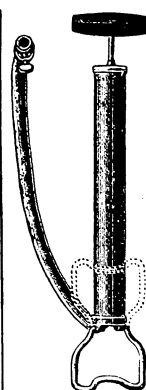
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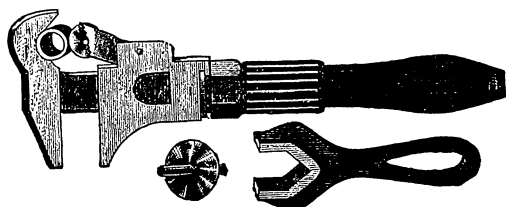
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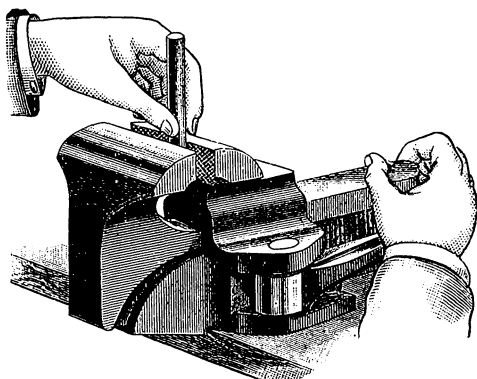
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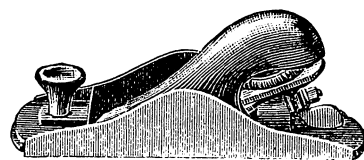
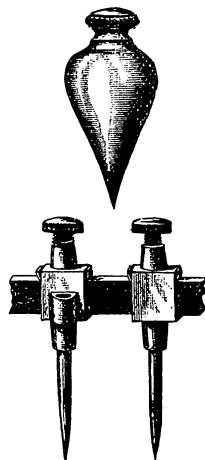
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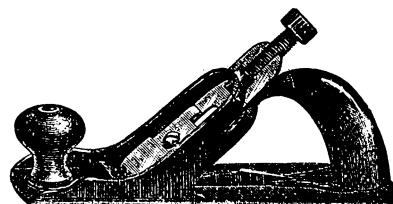
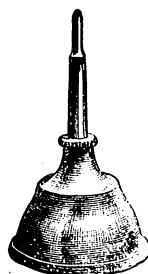
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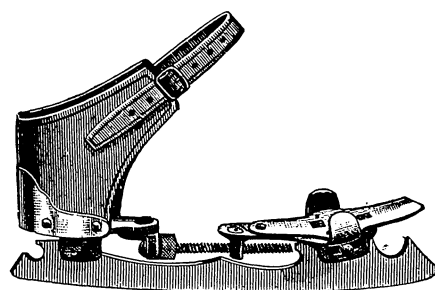
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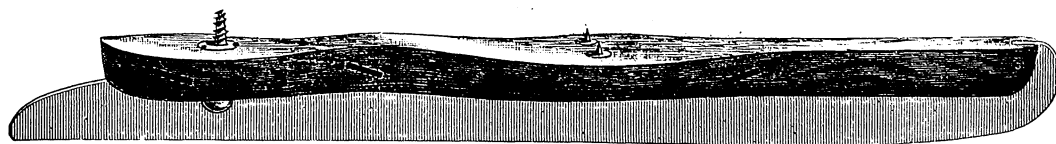
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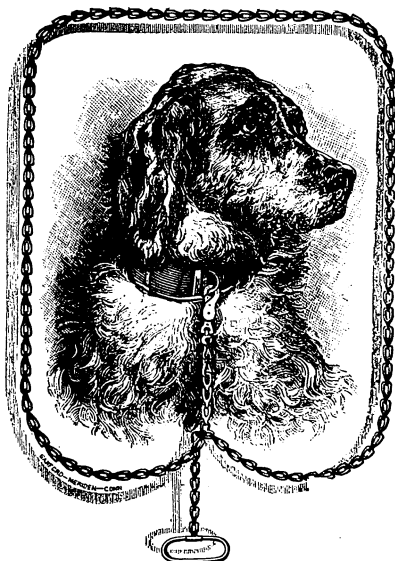
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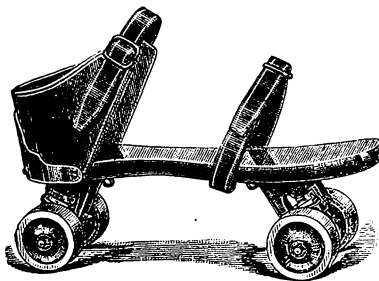
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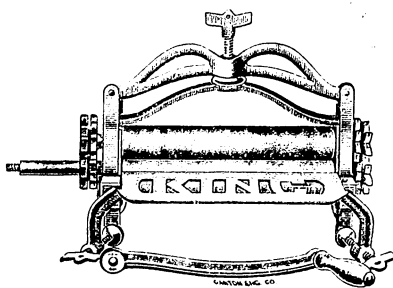
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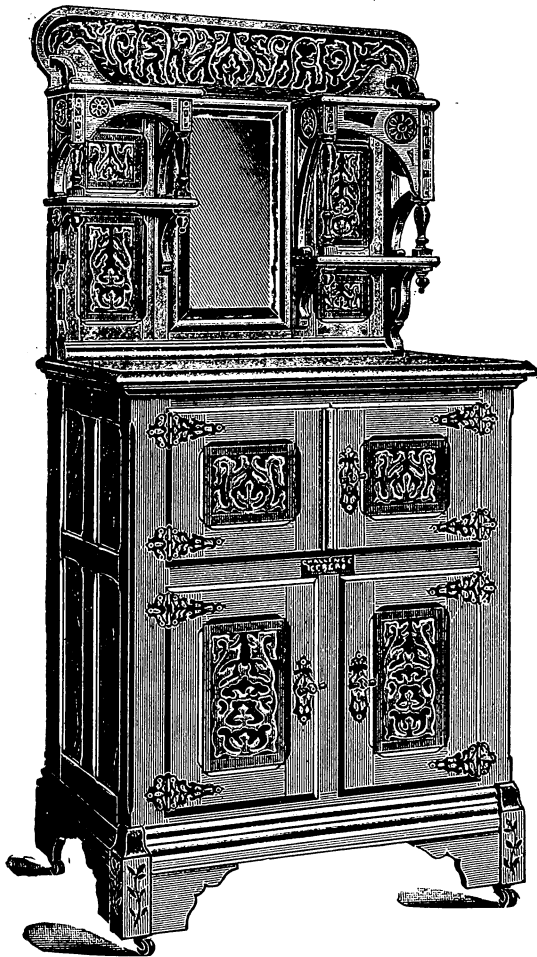
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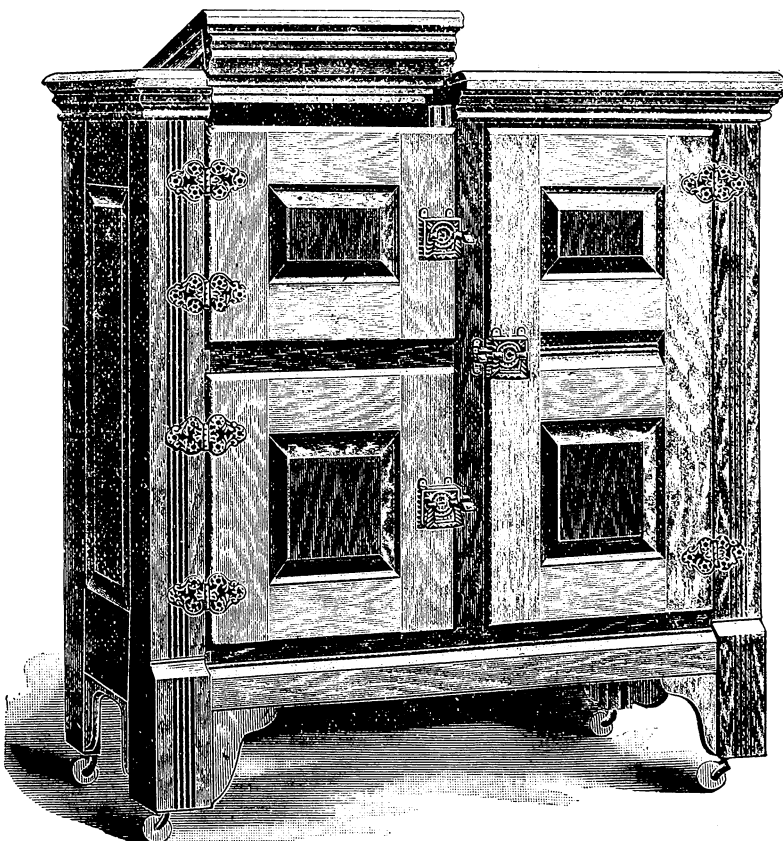
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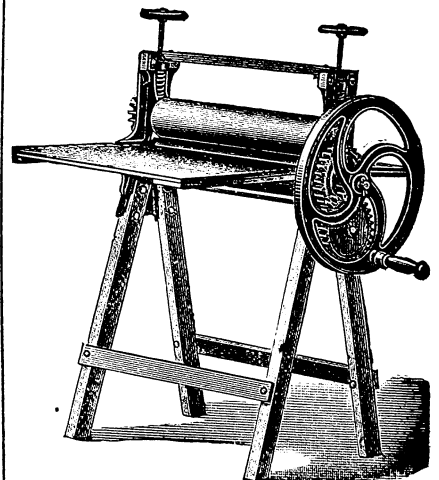
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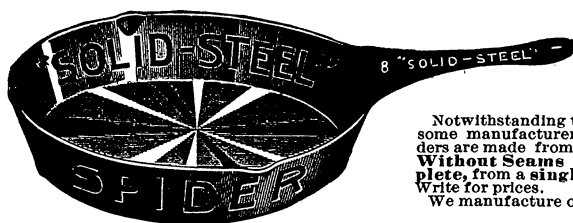
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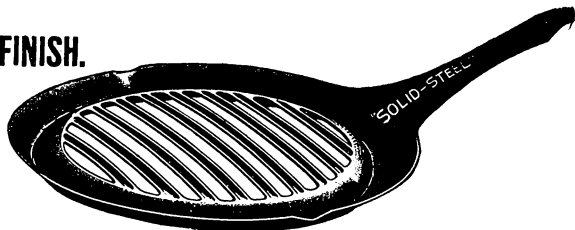
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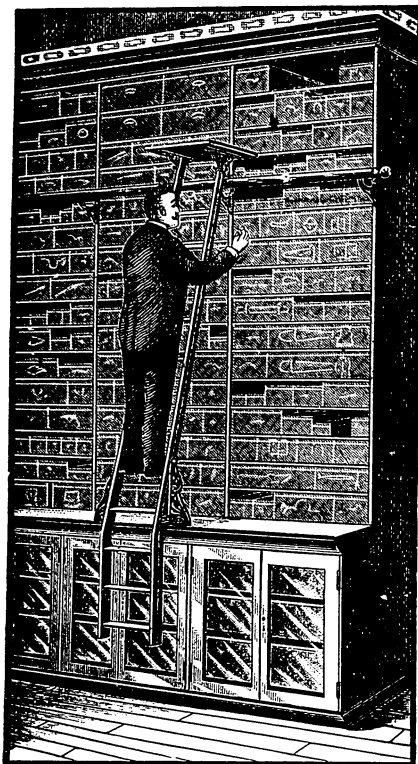


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Meeting with such universal appreciation, we think it to our interest to appoint ONE responsible firm of Hardware Merchants in EACH town and city as our sole agents.

ILLINOIS PURE ALUMINUM CO., LEMONT, ILLINOIS.

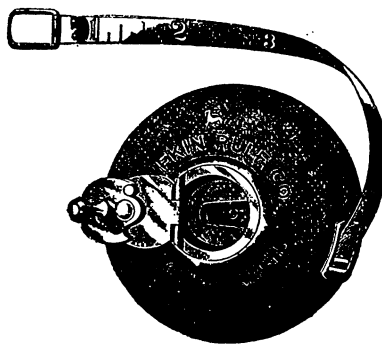
Manufacturers of Sheets, Medals, Utensils.

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Are Reliable.

Handbook of Ornament. By FRANZ SALES MEYER. A grammar of art industrial and architectural designing in all its branches, for practical as well as theoretical use. Authorized English edition. 580 pages, illustrated, cloth \$3.60

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## "RELIABLE" Steel Measuring Tapes.

Entirely new. Handle or crank when closed is perfectly flush with leather case. Opens by pressing button on opposite side and folds out double, giving increased leverage. Best and most convenient steel tape on the market. Fully guaranteed. Will send samples on approval. We carry a complete stock of our goods at our New York Office, 20 Murray St.

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## A Triumph in Small Bore Rifles. STEVENS' "FAVORITE" RIFLE.



Made for the 22 or 25 Rim Fire Cartridge.

WEIGHT, 4½ POUNDS.

22-INCH BARREL.

LEVER ACTION LIKE SHARPS. TAKEN APART IN TEN SECONDS.

IT IS SIMPLY IMPOSSIBLE

TO MAKE MORE ACCURATE SHOOTING BARRELS THAN ARE ON THIS RIFLE.



- No. 17. Plain Open Sights.....\$12.80
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A 60 Page Catalog showing our full line of Fire Arms with TRADE PRICE LIST sent with pleasure to all dealers.

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P. O. Box 5729.

Chicopee Falls, Mass. U. S. A.

MONCE'S NOVELTY GLASS CUTTERS. — INTERCHANGEABLE LOCK STENCILS.



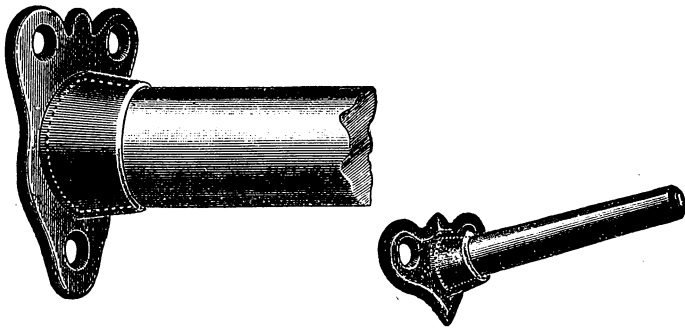
No. 1 Cutter. All glass men are familiar with this tool.

S. G. MONCE

BRISTOL, CONN.



# \$1 for 25 Cents.



## DESCRIPTION OF HOOKS.

An 8-inch Hard Wood Pin is inserted from rear of a heavy Iron Base, which is made cone shape, and being much larger at bottom, it is IMPOSSIBLE for the pin to get LOOSE, or come out from shrinking or other causes.

A large lot of these *Harness Hooks* will be sold at **25 cents per dozen** to close. Formerly sold at \$1 per dozen. Also lot of *Wardrobe Hooks* at **6¼ cents per dozen**, old price 25 cents.

Only this lot will be offered, as the manufacturer has gone out of the business.

**B. D. WASHBURN, 149 Congress Street,**  
**BOSTON, MASS.**

## THIRD REVISED EDITION. THE IRON AGE STANDARD HARDWARE LISTS

### FOR USE IN PRICE BOOKS.

Compiled by R. R. WILLIAMS, Hardware Editor of The Iron Age.

This pamphlet contains the principal standard Hardware price-lists in as clear and compact an arrangement as possible, so as to permit their being advantageously cut out and inserted in the price book. In order to make them adapted to this use they are printed on thin and tough paper of fine quality and on only one side of the paper.

#### Saucepans and Round Boilers.

| Ptnts.          | Plain  | Turned. | Tinned or En'd. |
|-----------------|--------|---------|-----------------|
| 1               | \$0.30 | .35     | .39             |
| 1½              | .32    | .37     | .44             |
| 2               | .35    | .39     | .48             |
| 3               | .42    | .47     | .56             |
| <b>Quarts.</b>  |        |         |                 |
| 2               | .50    | .56     | .63             |
| 2½              | .53    | .59     | .68             |
| 3               | .55    | .62     | .73             |
| 4               | .60    | .68     | .84             |
| 5               | .65    | .75     | .96             |
| 6               | .70    | .81     | 1.11            |
| 7               | .75    | .84     | 1.21            |
| <b>Gallons.</b> |        |         |                 |
| 2               | .85    | .96     | 1.31            |
| 2½              | 1.05   | 1.18    | 1.56            |
| 3               | 1.20   | 1.35    | 1.70            |

#### Wrenches.

| Inches.  | 6      | 8       | 10      | 12      | 15      | 18      | 21      |
|----------|--------|---------|---------|---------|---------|---------|---------|
| Black... | \$9.00 | \$10.00 | \$12.00 | \$14.00 | \$24.00 | \$30.00 | \$36.00 |
| Bright.. | 10.00  | 11.00   | 14.00   | 16.00   | 26.00   | 32.00   | 38.00   |

and inserted in price books, and can be used in connection with any of The Iron Age Hardware Price Books.

That the Standard Hardware Price Lists meet a want of the trade is evident from the fact that a Third edition is already called for.

**EVERY HARDWAREMAN SHOULD HAVE A COPY. Price 25 cts.**

Sent, postpaid, on receipt of Price, by

**DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, N. Y.**

#### Stove Hollow Ware.

Ground and Unground.

| POTS, KETTLES, ETC. (CAST IRON.) |        |     |     |      |      |      |
|----------------------------------|--------|-----|-----|------|------|------|
| No.....                          | 6      | 7   | 8   | 9    | 10   | 11   |
| Pots.....                        | \$0.65 | .75 | .85 | 1.00 | 1.25 | 1.75 |
| Kettles.....                     | .55    | .65 | .70 | .85  | 1.00 | 1.40 |
| T Kettles.....                   | .75    | .80 | .90 | 1.00 | 1.25 | .... |
| Spiders.....                     | .27    | .30 | .35 | .40  | .50  | .60  |
| Griddles Round                   | .22    | .25 | .27 | .30  | .... | .... |
| " Long..                         | .40    | .50 | .60 | .75  | .... | .... |

#### SCOTCH AND YANKEE BOWLS.

| No.....        | 1      | 2   | 3   | 4   | 5   | 6   |
|----------------|--------|-----|-----|-----|-----|-----|
| Scotch Bowls.. | \$0.35 | .40 | .45 | .50 | .60 | .70 |
| Yankee Bowls.. | .35    | .45 | .55 | .65 | .75 | .90 |

Some merchants use this pamphlet for reference, checking off invoices, etc., as it gives the leading lists in a more convenient form than they can otherwise be obtained. The lists are, however, intended primarily to be cut out

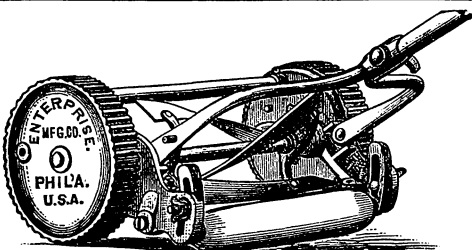
#### Glue Pots.

Tinned or Enamelled

| No. | 4/0.... | \$4.50 | No. 2 | ..... | \$8.40 |
|-----|---------|--------|-------|-------|--------|
|     | 3/0.... | 5.00   | 3     | ..... | 10.26  |
|     | 2/0.... | 5.50   | 4     | ..... | 12.42  |
|     | 0       | 6.00   | 5     | ..... | 14.58  |
|     | 1       | 6.75   | 6     | ..... | 16.94  |

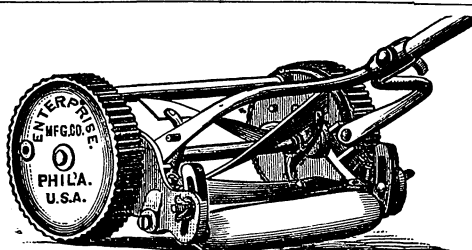
# THE ENTERPRISE M'F'G CO. OF PA.,

Third and Dauphin Sts.,  
Philadelphia, U. S. A.

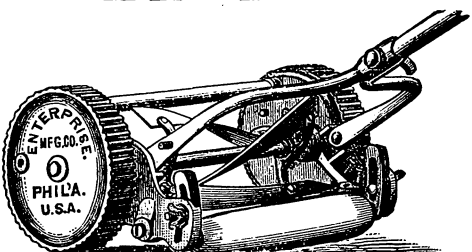


7, 9, 11, 13, 15 inches.

—O—  
PAINTED  
and  
TINNED.

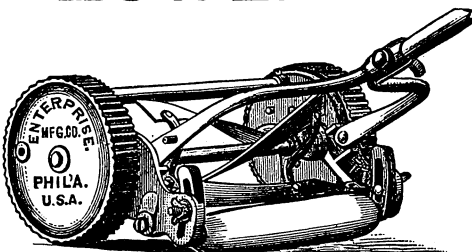


## ENTERPRISE LAWN MOWERS!



EQUAL TO  
the  
BEST.

—O—  
Prices quoted  
on Application.



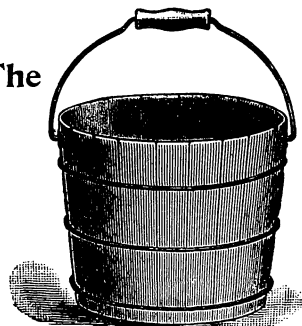
FOR SALE BY THE HARDWARE TRADE.

Branch Office and Warehouse with J. C. McCarty & Co., 97 Chambers Street, New York City.

SEND FOR CATALOGUE, FREE.

## Don't Kick

The



PATENTED, MARCH 24, 1891.

—until you have learned that such an operation cannot injure this one.

**Of the Wood.**—In a dreary swamp a soaked seed sprouted, grew into a slender sapling, and thence in time to a stately tree, that from infancy had never known what it was to have dry feet, and finally became "water-cured."

**The White Cedar of Virginia** when properly seasoned never becomes water-soaked, and, as to its lasting qualities, 100 years frequently roll by leaving it still sound and hearty.

**Of the Metal.**—Stout hoops of round iron welded by Electricity, and becoming thereby practically one solid piece, are by a patented process forced into a series of grooves on the outside of staves, and obtain a grip on their surroundings that knows no "let up" (or "down" for that matter), and by reason of heavy galvanizing they defy corrosion.

Shall we send you a circular of this BUCKET?

**RICHMOND CEDAR WORKS,**  
MANUFACTURERS OF WOODENWARE,  
RICHMOND, VA.

## American Stamping Co.,

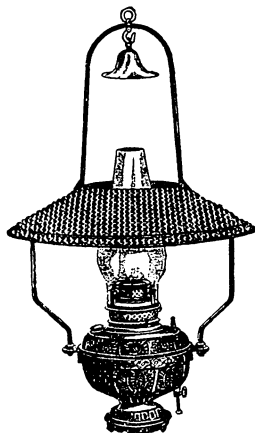
Manufacturers of

All Kinds of Tinware and Sheet  
Metal Goods.

N. Y. Office and Salesroom, 104 & 106 John St.  
Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.

## THE LAMP TO LIGHT YOUR STORE.

MAMMOTH CENTRAL DRAFT BANNER.



With 20-inch Tin Shade.

**No. 858. Size 3.**

Enlarged Oil Pot

No Smoke.

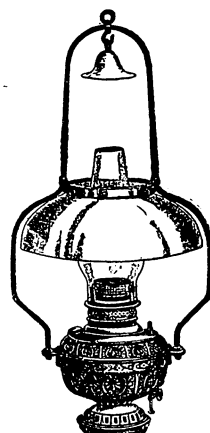
No Smell.

Cheaper and Better than Gas.

300 Candle Power.

Holds One Gallon Oil.

Burns Brightly about 10 hours.



With 14-inch Dome Shade.

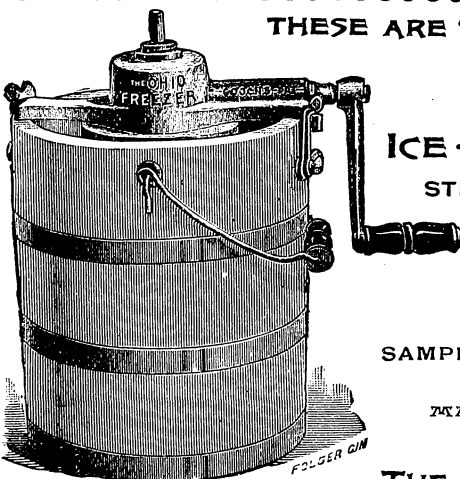
The Banner is the only Fount having Extra Feeder Wick which supplies oil to the Burning Wick. Harp has our Patent Extension Band, allowing Fount to pass down and through instead of lifting over as in the old style harp. Flame is regulated by our Improved Ratchet Movement. This Movement gives an exactness and nicety in adjusting that is not possible in any other wick raising device.

—MANUFACTURED ONLY BY—

## THE PLUME & ATWOOD MFG. CO.,

NEW YORK. BOSTON. CHICAGO.

THESE ARE "STIRRING" TIMES.



THE "OHIO"  
ICE-CREAM-FREEZER  
STIRS FROM THE BOTTOM.

HAS ALL NEEDED MOTIONS—NO MORE.  
NEVER TURNS BACK.

Has all the Good Points.  
None of the Bad. . . . .

SAMPLE on approval to responsible dealers, express prepaid, east of Kansas City.

MADE IN ALL THE SIZES.

MANUFACTURED BY

THE SAM'L C. TATUM CO.,

No. 264 WATER ST., CINCINNATI, O.

"IT'S A COLD DAY"  
WHEN A GOOD FREEZER IS NOT WANTED.

# Hardware Dealers and Rudge Cycles.

Agents wanted immediately for unoccupied territory. Write for illustrated catalogue and Price-list of 1894 Wheels.

## The Bronson Supply Co.,

Sole Agents for the United States. 72 Beekman St., New York, and Cleveland, Ohio.



No. 3

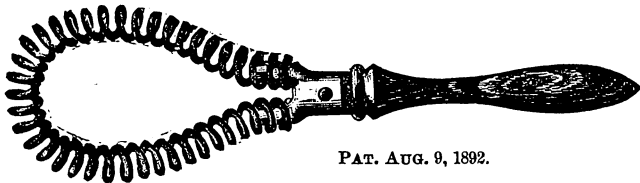
Globe Street Lamp.

### Light your Streets and Driveways. The S. G. & L. CO. Tubular Globe Street Lamp

IS THE Best Street Lamp Manufactured.  
Equal to the best Gas Light.  
Will not Blow Out in the Strongest Wind.  
Will not Smoke.  
Will not Freeze.  
Automatic Extinguisher.  
Outside Wick Regulator.  
Will Burn Four Hours for One Cent.

MANUFACTURED BY  
**STEAM GAUGE AND LANTERN CO.,**  
SYRACUSE, N. Y.  
Western Branch, 25 Lake St., Chicago, Ill.

## THE BOSS DUST BEATER.



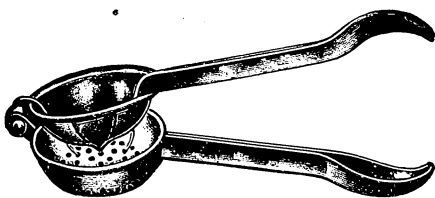
PAT. AUG. 9, 1892.

NEAT, DURABLE, AND DOES THE BUSINESS.

For removing dust and filth from Clothing, Upholstered Furniture, Rugs and Carpets it is just the thing. Will raise the nap and so improve the appearance. Will not, like other Dust Beaters, leave marks, nor tear the fabric. The coil is of steel wire secured in a malleable iron socket and attached to an enameled wooden handle. Just what everybody wants.

Sent by Mail, 35 Cents.

**PEABODY & PARKS,**  
Manufacturers, TROY, N. Y.



## Do you make Lemonade?

If so you want our Squeezer. Positively the best. Suitable for any size Lemon. Write for catalogue and prices.

BERGER BROS., 237 Arch St., Philadelphia, Pa.

## CLOTHES WRINGERS. COLBY WRINGER CO.,

MONTPELIER, VT.  
HAVE YOU Our Price-List?

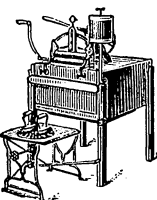
## WASHING DAY.

The saddest of all the year,  
It brings no rest, it brings no cheer.

But the "Columbian" (Self-Heating) Washer and Stove Combined makes "Washing Day" as good as the others of the week. Does away with all lifting, and being around a hot stove. Washes and boils the clothes at the same time. A wonderful seller.

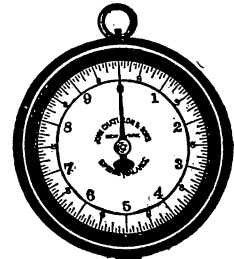
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## John Chatillon & Sons,

85, 87, 89, 91, 93 CLIFF ST., NEW YORK.



ESTABLISHED  
1835.

SEND FOR  
PRICE LIST.



Sole Agents for  
**Foster Bro.'s Butchers' Cutlery.**



**John Chatillon & Sons, N. Y.**

COMMON MOUSE TRAPS  
BEST FOR USE!

**Ripley Mfg. Co.,** Unionville, Conn.



Porcelain-Lined Lemon Squeezers, Steak Hammers, Boot Jacks, Magnetic Tack Hammers, Mallets, Bung-Starts, Hand Screws, Beacon Hill Pat. Mouse Traps, Sunny-Side 2 lb. Lap Board.

## Phillips Screens

FOR DOORS AND WINDOWS, ARE WELL  
MADE, FROM GOOD MATERIALS BY

**A. J. Phillips & Co., Fenton, Mich.**

NEW  
and the  
BEST.

"THE HUSTLER"

NEW  
and the  
BEST.

# Post Hole Digger.

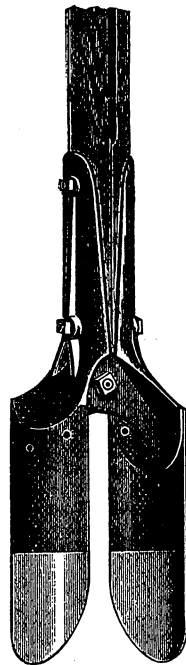
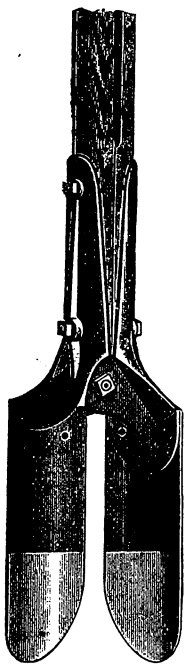
 **BUILT FOR BUSINESS.** 

This tool combines simplicity with correct form for easy and rapid digging. It is neat in design, finely finished, strong and durable.

The single round handle opens in halves to operate, being easily grasped and less tiresome than two separate handles; all other movements of split handles are liable to pinch the operator's hands.

This special style of bolting handles to shanks in round form enables them always to be kept tight in case of shrinkage. A shoulder is provided at the bottom to receive the full thrust, instead of on the bolts. This is not found in other makes, and prevents handles from splitting.

The best materials only are used. Fully guaranteed.



**5**—Other Styles of Post Hole Diggers to—**5**  
Suit all Soils.

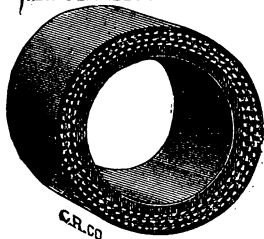
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**JOHN H. GRAHAM & CO.**

**113 Chambers St.,  
NEW YORK.**

NEW SEAMLESS TUBE



## Who Has Not Had Bad Hose?

Who has not lost time, patience, money, by attempting settlement for such goods?

**THE CAUSE** in nine cases out of ten is the lapped seam.  
**THE REMEDY** is in buying our

### PATENT SEAMLESS TUBE HOSE,

made by machinery, the tube run like lead pipe, through a die. There is no lapped tube, no seam, no cracks, no defects; water cannot get through to rot the duck and cause the hose to burst.

Made in All Sizes and Kinds of Garden, Engine, Steam, Fire, Brewers', Cotton Hose, &c.

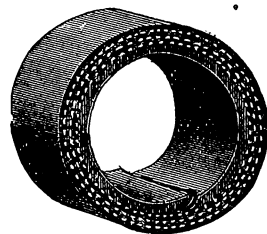
Order a Sample Bale of our Seamless-Tube Hose—Best in the World, costs no more than ordinary lapped-seam hose. The different colors, Red, White, Black, Green and Yellow, make a fine window or sidewalk attraction.

### CLEVELAND RUBBER WORKS

of the Mechanical Rubber Co.,  
CLEVELAND, O.

Makers of Mechanical Rubber Goods, Clothing, Druggists' Sundries, Specialties, Etc.

'OLD LAPPED TUBE'



**SALES OF**  
**Over Two Million Feet**

#### GARDEN HOSE

alone during the past year, distributed throughout the United States, and not a single piece complained of, justifies us in guaranteeing that it will give absolute satisfaction.

We were awarded an order of 25,000 ft. for World's Fair of our celebrated  
**Seamless-Tube**  
COTTON RUBBER-LINED HOSE.

**We Want Your Trade.**  
Send for 60-page Catalogue.  
Write for Prices and Samples.

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**Fred. J. Meyers Mfg. Co.,**  
Hamilton, Ohio,  
Makers.



**F. J. MATTISON,**  
Eastern Ag't,  
New York.

# The Sun Manufacturing Co.

Successors to the Jno. M. Waddel Mfg. Co.,

ARE SOLE OWNERS AND MANUFACTURERS OF

**Waddel's Improved Coffee Mills,  
Cathedral Gong Money Drawer and Surprise Rat Traps.**  
Beware of Infringements.—We will protect our Patents.

**"THE 'SUN' ONLY, SHINES FOR ALL."**

A New Name, A New Reputation,

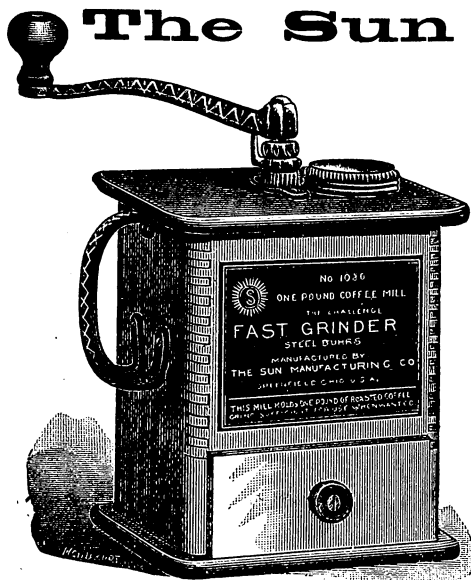
**A New Line of Coffee Mills**

That under the SUN Brand shine as leaders.

**RAPID GRINDERS that will STAND THE WEAR.**

**STEEL ALLOY BUHRS,**

A metal of recent discovery for this purpose used solely and only by the SUN. Warranted to outwear, outgrind and outsell any Coffee Mill ever put on the market.



Our New Line bears the Sun Trade Mark and is labeled Steel Alloy Buhrs.

Write for Our Catalogue and New Prices.

Order a Sample Mill.

We Challenge a Competing Test for Rapid Grinding and Wearing Surface.

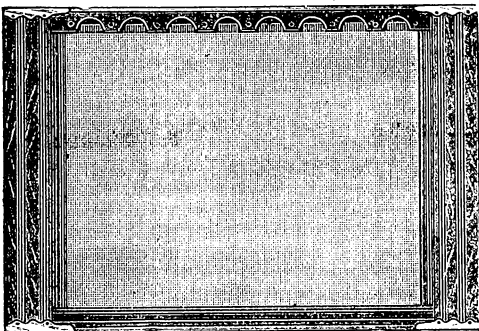
**THE SUN MANUFACTURING CO.,**

Greenfield, Ohio, U. S. A.,

MANUFACTURERS OF  
Cash Registers, Money Drawers, Coffee Mills and Wooden Ware Specialties.

## EMPIRE "A" WINDOW SCREEN.

WITH PATENT FLY ESCAPE. (Patented Aug. 16, 1892.) MADE IN EIGHT SIZES.

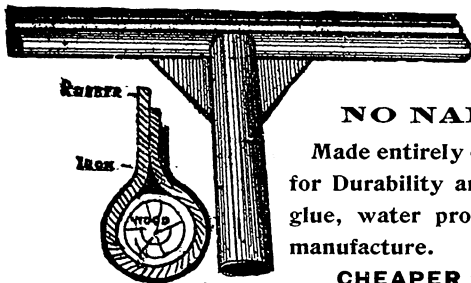


The only screen made that will keep a house free from flies. Any ordinary screen will keep flies out, but are just as effectual to keep them in. With this screen, while it will keep them out, it will also allow them to get out. As shown by the cut, the principle is the same as in the well-known balloon fly trap, constructed with openings in top of frame leading up and out. Flies light on the screen and follow the wire cloth up to these openings and thus find their way out. Flies will not go down through small openings and therefore will not return by the way they went out. Well and strongly made of hard wood finished in oil. Extensions are operated by steel springs so they can be placed either under or just on outside of sash. If placed outside of sash pressure of springs holds them in place and window can be raised and lowered without removing screen. Corners of screens covered and strengthened with iron caps as shown on cut. These caps are covered with a bronze paint, which while adding very much to the appearance of the screen, makes it the strongest and most durable window screen made.

Also EMPIRE SCREEN DOORS, With Patent Fly Escape, on same principle as Window Screens described above. NEW YORK AGENTS:

White, Van Glahn & Co., Dealers in General Hardware, 15-16-17 Chatham Sq., N. Y.

Patented January 4th, 1887.



## BOURKE'S Nonpareil Window Cleaner.

**NO NAILS. NO SCREWS.**

Made entirely of Galvanized Iron and is Unexcelled for Durability and Simplicity of Construction. No glue, water proof cement or shellac used in its manufacture.

**CHEAPER than the CHEAPEST,  
BETTER than the BEST.**

For prices on this and other specialties address **THE BOURKE MANUFACTURING CO., Youngstown, O.**

## The Laws of Business

FOR ALL THE

**States and Territories of the Union.**

By THEOPHILUS PARSONS, LL.D.

864 pages, 6 x 9 inches; full leather, \$4.50.

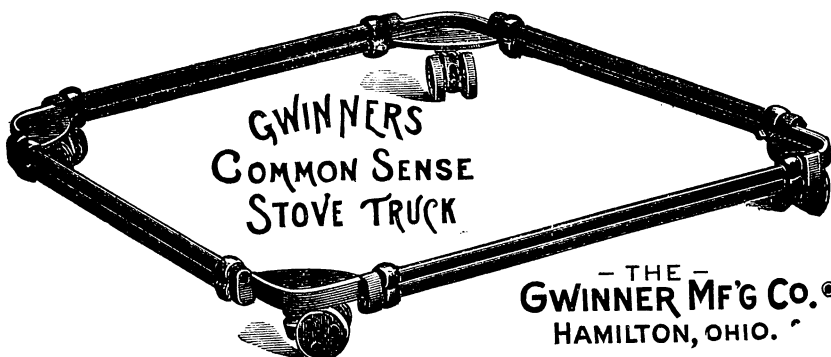
Contains information of the highest value to business men, treating fully and clearly of contracts, sales, agency, agreements and assessments, stoppage and transitu, considerations, limitations, notes and bills of exchange, interest and usury. Embraces chapters on commercial law in general, bonds, assignments, guaranty, the statute of frauds, receipts and releases, payment, partnership, arbitration, carriage of goods and passengers by railroad and other carriers, hotel keepers, patents, copyrights, statute of limitations, the law of place, shipping, marine, fire and life insurance, deeds of land, mortgages of land, mortgages of personal property, leases, liens of mechanics and material men, the recovery of debts, wills, executors and administrators, guardians, and the legal rights of farmers, &c. Also abstracts of the laws of all the States and Territories relating to the collection of debts, usury, the execution and acknowledgment of deeds, witness required to wills, holidays and days of grace, mechanics' liens, chattel mortgages, and nearly 300 approved forms which have been tested in courts.

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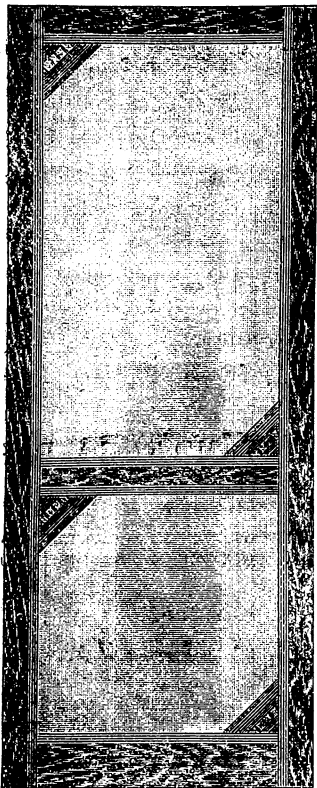
**DAVID WILLIAMS,**

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**GWINNER MFG CO.®**  
HAMILTON, OHIO.



## A HOWLING SUCCESS!

# THE EMPIRE SCREEN DOOR.

Last year the trade seemed a little afraid of it on account of the low price. It is now selling in great shape, however, so much so that we are getting it patented.

We find that whenever we originate a pattern, some competitor will always make a caricature of it and put it on the market at a cut price as soon as we have established the pattern and taken the trouble and hard knocks to make it popular. This time we thought we would make the cut price ourselves on the start, and having patented the design, see if we couldn't get for ourselves what little there was in it. The design is neat, and of such a character that we can make it rapidly without slighting the quality.

It is made in only one finish—Pine shellaced and varnished, natural color. If you take hold of it, you will find it a seller. The price is right, and the goods please

### Our Department for Making Screens to Order

should also interest you. We furnish the trade without charge a working model of our screen, a quantity of samples of wood finished, wire cloth, printed matter, etc. You will find many of your customers patronizing this department. Lots of people would have screens made to fit their doors and windows, if they could get a really neat article at a moderate price.

**You carry no stock.** When you get your orders send us specifications and we make up the work promptly. Good, substantial screens in neat, handsome finish and style.

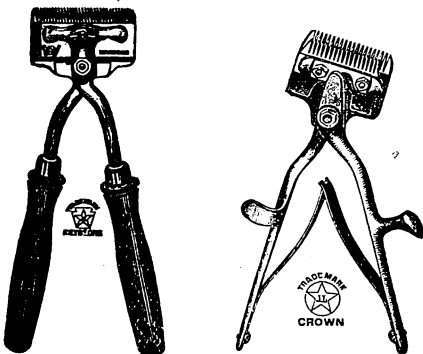
All that we require is you give the model publicity, and the department your attention. If you wish the agency for your city, write at once. Get the model, etc., and be ready for business as soon as the flies are.

We are makers of The Bonanza, Perfection and Extension Window Screens. Also Phillips window Screen Frames. Send for complete catalogue.

**A. J. PHILLIPS & CO.,**

**FENTON, MICH.**

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**For HORSEMEN OR BARBERS**  
Send Postal Card for our new Illustrated Catalogue.

**JESSE LEE & SON,**  
37 SO. FOURTH ST., PHILADELPHIA.

### NEW ADJUSTABLE BENCH LEVEL.

WITH GRIND AND GRADUATED VIAL.

4-6 and 8 inch.



Three Sizes.

MANUFACTURED BY

**C. F. RICHARDSON & SON,**

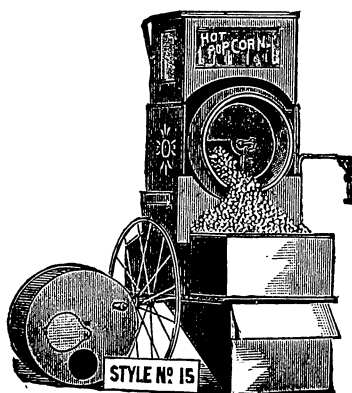
ATHOL, MASS.



WATERPROOFED through SOLID. Light, CLEANLY, Handsome, DURABLE. Cheap as a GOOD ARTICLE can be made. ORNAMENTAL as well as USEFUL. Sold DIRECT TO THE TRADE. In this ARTISTIC age no dealer can afford to be without DECORATED FLAX FIBER WARE, bearing above trade-mark and made only by above Company.

### OLSEN'S AUTOMATIC

## King of Corn Poppers, Peanut and Coffee Roasters.



The greatest wheel of fortune out, for any person 12 years and upward; \$1.00 to \$50.00 profit per day; 1500 now in use,

Guaranteed to have no equal. Agents wanted. Write for illustrated catalogue and prices on Pop Corn, Shelled or on Cob, Balls, Bricks and other supplies.

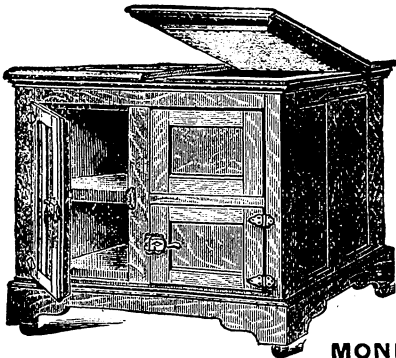
**A. B. OLSEN, Sole Mfr.,**  
218-220 E. Mo. Ave., - - Kansas City, Mo.



# To YOUR Interest !

A FAC-SIMILE OF THE ADVERTISEMENT WITHIN THE MARGINAL LINES BELOW WILL APPEAR DURING THE RETAIL SEASON IN MOST OF THE LEADING MAGAZINES AND HOUSEHOLD PUBLICATIONS.

WOULD IT NOT BE TO YOUR INTEREST AS A DEALER TO PREPARE



The superiority of Stoneware Lining in Refrigerators becomes obvious at a glance. It neither sweats nor absorbs moisture and never becomes sour or musty. It is made without open seams; is practically indestructible and is very easily cleaned.

## Stoneware Lined Refrigerators

are built upon the best known principles of refrigeration. A perfect circulation of dry, cold air prevents the accumulation of gases and vapor or the mixture of flavors, while the consumption of ice is greatly reduced. The first cost is greater than for ordinary refrigerators but they are far cheaper in the end. If your dealer don't keep them, write for Catalogue. We pay the freight.

MONROE REFRIGERATOR CO.,

LOCKLAND, OHIO.

IN GOOD TIME FOR THE DEMAND THAT WILL THEREBY BE CREATED ?

### AS A RULE

WE SELL BUT ONE DEALER IN A TOWN, AND WILL NOT SELL TO CONSUMERS IN PLACES WHERE OUR GOODS ARE SOLD BY DEALERS, BUT WILL REFER INQUIRIES TO THE DEALERS.

WRITE FOR CATALOGUE AND

TRADE DISCOUNTS.

# SAFETY KETTLE BOTTOM.

Made from STEEL.

Prevents meats and vegetables from burning while cooking. Can be used for various purposes, either as Steamer, Broiler, Toaster, etc.



Cannot be Broken.

burning while cooking. Can be used Broiler, Toaster, etc.

PATENT APPLIED FOR.

FOR PARTICULARS ADDRESS,

**DIAMOND HARDWARE CO.,** 620 ATLANTIC AVE., BOSTON, MASS.

# No. 4 ALL RATTAN BROOM.

Made for Switch, Snow, Yard, and all purposes to which an All Rattan Broom is especially adapted. It has been thoroughly tested, and our patent fastening is conceded to be the best, most convenient, and holds the rattan more firmly and in better shape than any other ever introduced. A trial will insure its continued use. We make a specialty of

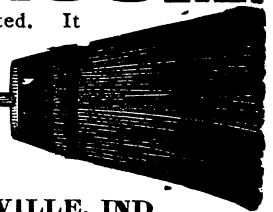
**BROOMS and BRUSHES**

FOR

RAILROADS, SHOPS, WAREHOUSES, STREET, STABLE, BLOOM, CHILL, CASTING AND MOULDING PURPOSES. Write

**JOSEPH LAY & CO.,**

RIDGEVILLE, IND.



## GOLDEN CROWN WARE.

EXCLUSIVE SALE IN EACH TOWN GIVEN.

Allowance towards Advertising

Be Quick if you want Control of your City.

Particulars on Application.

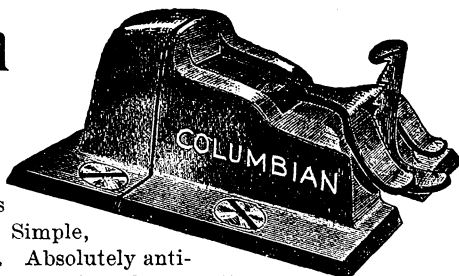
**THE STUART & PETERSON CO.,**

Burlington, N. J., U. S. A.

# Columbian

## Sash

Locks three ways with one motion. Simple, strong and durable. Absolutely anti-rattle and burglar proof. Sample by mail, 35c.



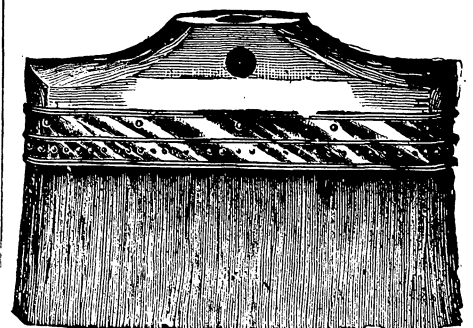
## Lock.

**COLUMBIAN SASH & DOOR LOCK CO.,**

WAUSEON, OHIO.

# BRUSHES

FOR THE



**Hardware Trade,**

Whitewash, Horse, Paint, Window, Shoe,

And Every Variety of Brushes and

**Wire Goods.**

Close prices and prompt shipments. Get samples and catalogue for the asking.

**Cincinnati Mfg. Co., Cincinnati, O.**

TEMPORA MUTANTUR ET NOS MUTAMUR IN ILLIS.

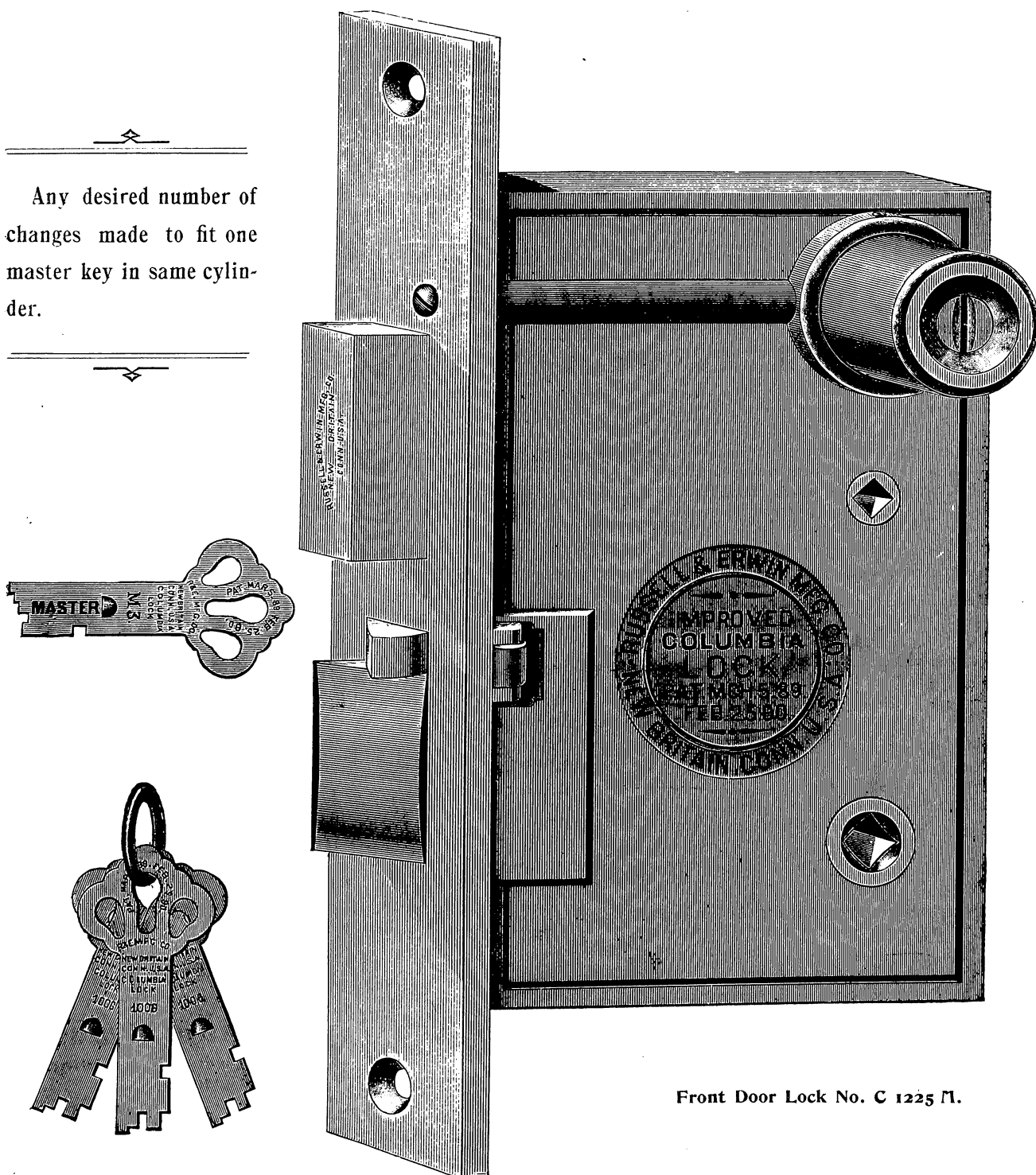
**Russell & Erwin Manufacturing Co.,**  
 NEW BRITAIN, CONN., NEW YORK, PHILADELPHIA, BALTIMORE, LONDON,

MANUFACTURERS OF THE

# Columbia Cylinder Lock.

**Easily Applied, no Adjustment of Cylinder Required. Full Size of Key  
 Shown in Illustration.**

Any desired number of  
 changes made to fit one  
 master key in same cylinder.

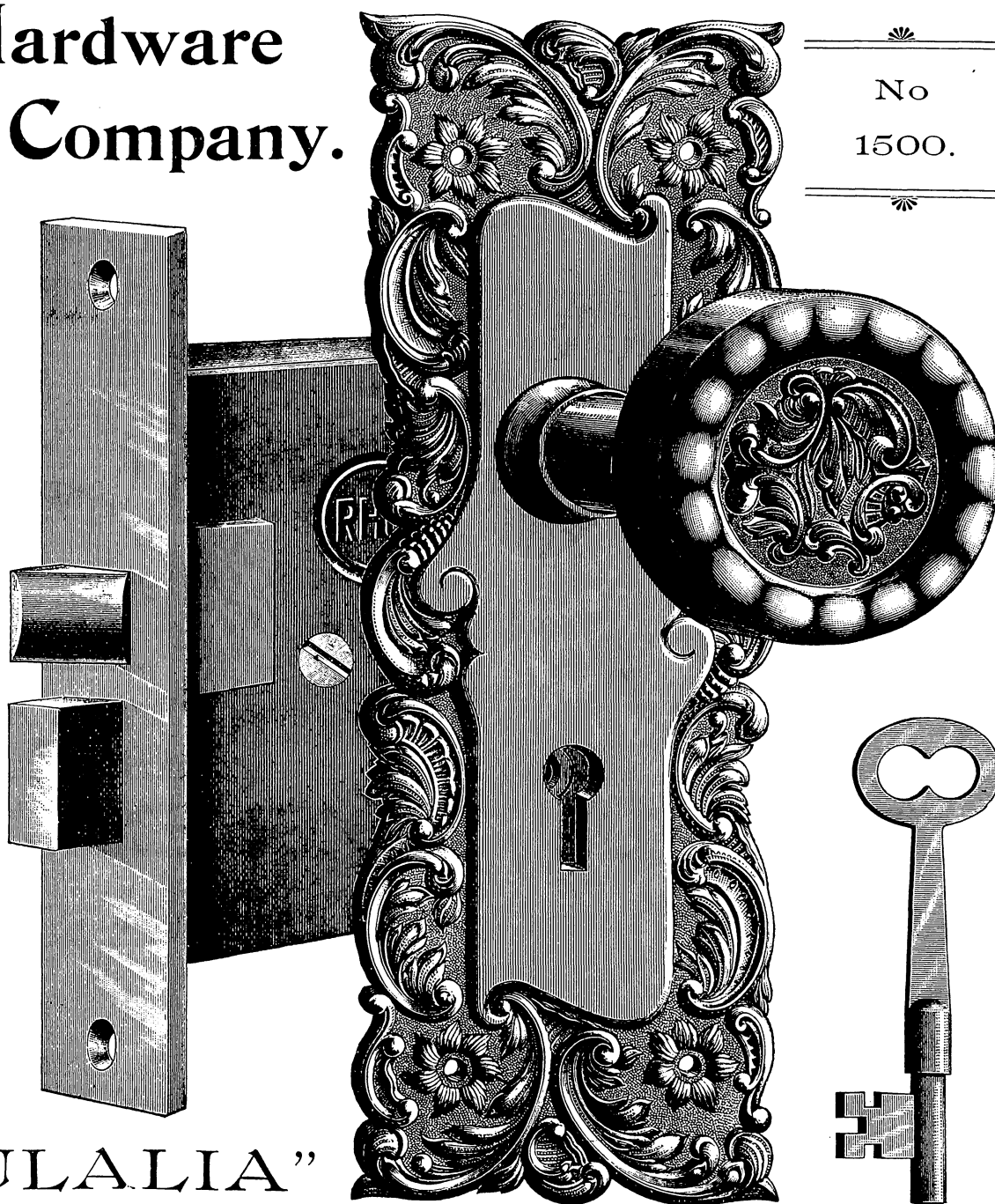


Front Door Lock No. C 1225 M.

The Columbia Cylinder Lock is made for Front, Vestibule and Office Doors.  
 The Office Door Lock is especially adapted for large office buildings.

# READING Hardware Company.

No  
1500.



“EULALIA”

DESIGN  
LOCK SETS.

WROUGHT BRONZE TRIMMINGS.

INSIDE LOCK SET, No. 1500, FRONT DOOR SET, No. 1550,  
VESTIBULE SET, No. 1555.

These Sets are Handsome, Durable and Cheap. They are finished in “Antique Copper,” and are packed complete with everything necessary to put on doors.

WAREHOUSES:

NEW YORK,  
81 Reade St.

PHILADELPHIA,  
514 Commerce St.

CHICAGO,  
73 Wabash Ave

FACTORIES AND MAIN OFFICE:

READING HARDWARE CO.,

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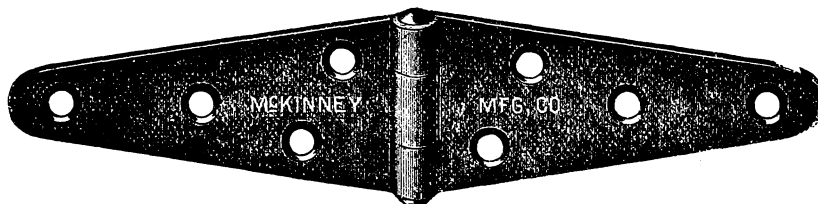
Reading, Pa.

# STEEL HINGES AND BUTTS.

STANDARD GOODS.

McKINNEY MFG. CO. - ALLEGHENY, PENN.

SEND FOR  
LIST.



ORDERS FILLED  
ON SIGHT.

**"NONE BETTER."**

## BARN, MILL AND FIRE DOOR HANGERS HIGHEST AWARD

at WORLD'S FAIR, 1893,

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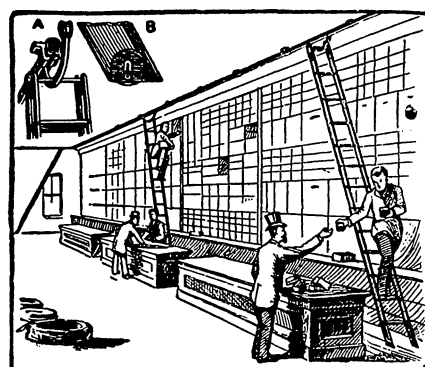
Parlor, Barn and Fire Door  
Hangers.

SEND FOR CATALOGUE.

COBURN TROLLEY TRACK MFG. CO.  
HOLYOKE, MASS.

Fire Door Hangers. Best in the World. Equipped  
with Automatic Fire Door Fittings.

We make four styles of ROLLING LADDERS to  
reach shelving of any height.



# P. & F. CORBIN,

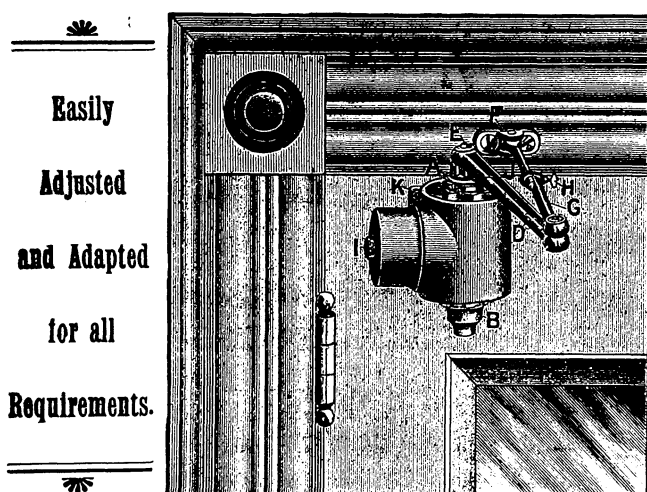
New Britain, Conn.

New York.

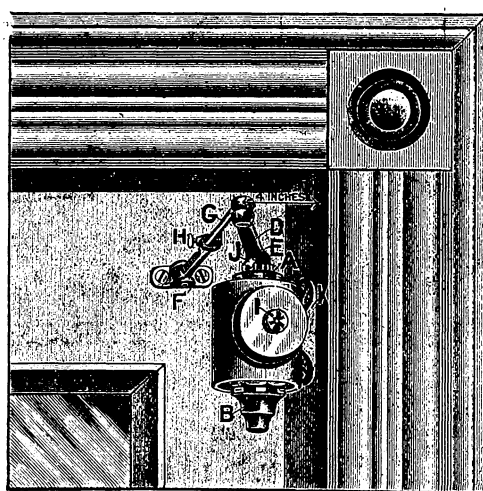
Philadelphia.

Chicago.

—) MANUFACTURERS OF ( —



Easily  
Adjusted  
and Adapted  
for all  
Requirements.

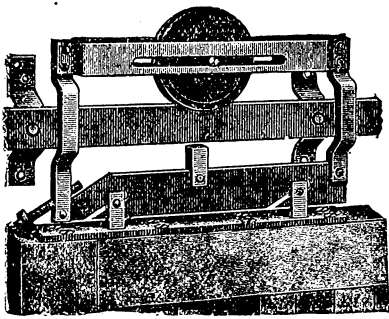


Looks Well,  
Acts Well,  
Wears Well.

## LIQUID DOOR CHECKS AND SPRINGS,

Fine Builders' Hardware. Wood and Machine Screws.

Catalogues and Prices Furnished on Application.



## LANE'S PATENT NOISELESS STEEL PARLOR DOOR HANGER.

This Hanger is made of Steel.  
The Wheel is also Steel, except the filling or tread.  
The Track is of Steel—a single one only.  
The Hanger is Anti-Friction.  
More nearly Noiseless than any other.  
Ease of adjustment.

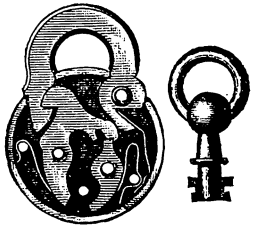
Can be erected with half the labor others require.  
Track will not swell, shrink or warp out of true.  
No cutting of doors.  
No matching of hardware.  
Simplicity in all its parts.  
Durability.

ALSO LANE BARN DOOR HANGER AND TRACK. SEND FOR CIRCULARS.

Manufactured by

**LANE BROS., Poughkeepsie, N. Y.**  
**JOHN H. GRAHAM & CO., General Agents, 113 Chambers St., New York.**

## PATENT PERFECTION PADLOCK.



*Eight Tumblers, Key Turning Both Ways.*

Sizes,  $\frac{1}{4}$  inch to  $2\frac{1}{4}$  inches, of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also,  $\frac{1}{2}$  and  $\frac{3}{4}$  inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world.  
Adopted by the United States Treasury for bonded warehouses.

**AMES SWORD CO., Chicopee, Mass.**

Send for Price-Lists and Circulars.

SIMPLEST IN CONSTRUCTION.  
EASIEST FITTED.



Cheapest and Best  
Balance Made.

WRITE FOR CATALOGUE.

**The Vanderbilt Sash Balance Co.,**  
**CANANDAIGUA, N. Y.**  
General Agents, Harmon & Dixon, 118 Chambers St. New York.

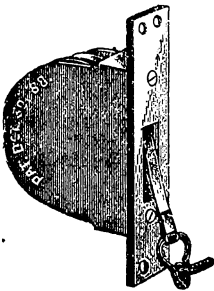
## DOES IT PAY?

To buy an inferior article, which your trade condemns, when you can get

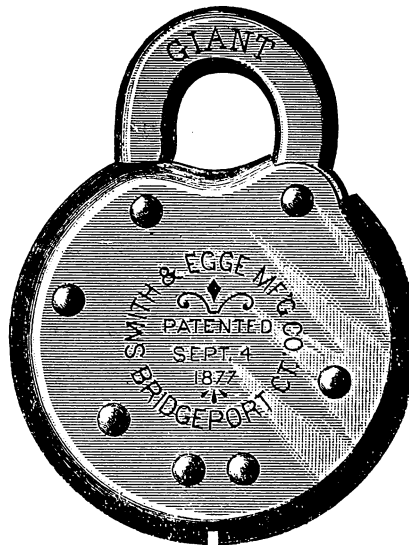
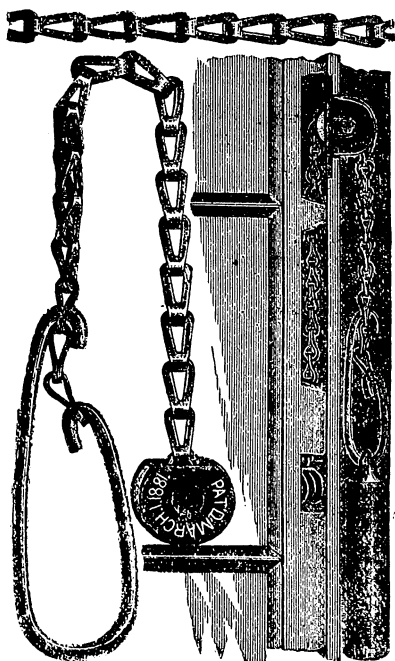
## THE CALDWELL SASH BALANCE.

The best material, right principle and care in making and testing have made it the **LEADER** for five years. Write to

**CALDWELL MFG. CO., Rochester, N. Y.**



## THE SMITH & EGGE MFG. CO., BRIDGEPORT, CONN.



## THE GIANT PADLOCK.

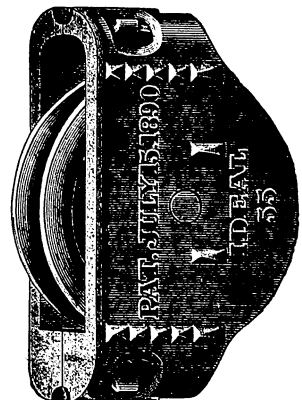
Centennial Award. "Superior in Every Respect."

This is one of the best selling locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited.

## THE GIANT METAL SASH CHAIN

is a substitute for cord in hanging weights to windows. It is manufactured by us only, and by automatic machinery, patented and owned exclusively by ourselves, and whereby we secure uniformity of construction and quality. We have been to great expense in producing a metal having all the qualities and conditions requisite for making suitable chain for this purpose, and to prevent other chain of the same pattern of link and of the same general appearance, but made from an inferior metal, being offered as the same thing, we patented the word "Giant" as a Trade-Mark, as applied to either metal or chain. Trade-Mark Registered April 16, 1878, and October 22, 1878, and our metal is therefore known in the market as "Giant Metal," and our chain as "Giant Metal Sash Chain."

## Ideal Sash Pulley, No. 55.



Adapted for auger socket or machine made mortise. Applied without chisel or screws, quickly and a perfect fit in every case. The only all round Sash Pulley made. Sample free. Price on application.

**STOVER MFG. CO.,**  
145 River St., Freeport, Ill.

## SASH WEIGHTS

**E. E. BROWN & CO.,**

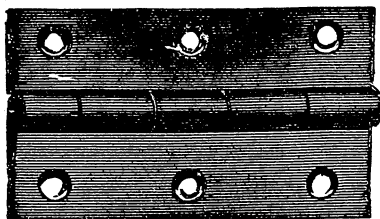
**McKean and Meadow Sts.,**

**PHILADELPHIA, PA.**

## Phillips Screens

FOR DOORS AND WINDOWS, ARE WELL  
MADE, FROM GOOD MATERIALS BY

**A. J. Phillips & Co., Fenton, Mich.**



## Cast Brass Butt Hinges

IN STOCK AND FOR SALE BY

**W. & J. TIEBOUT,**

Nos. 16 & 18 Chambers Street, New York,  
MANUFACTURERS OF

**BRASS, GALVANIZED & SHIP CHANDLERY  
HARDWARE.**

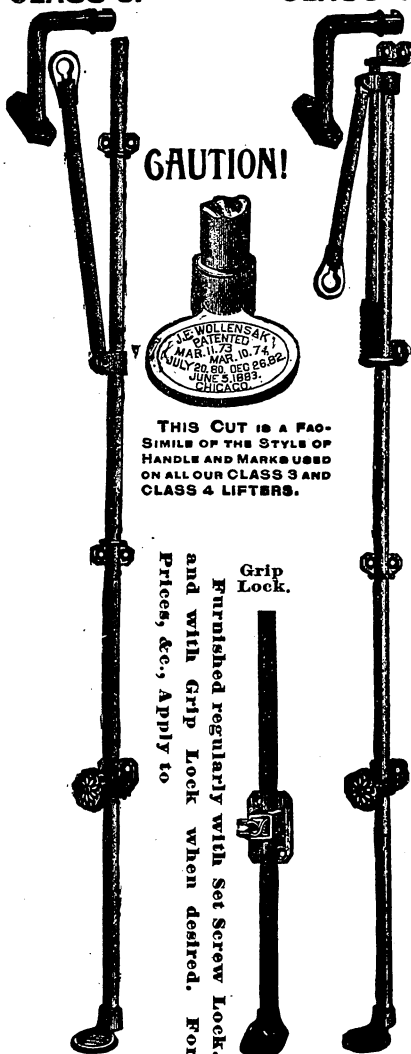
## Transom...Lifters

OLD RELIABLE

**J. F. WOLLENSAK'S PATENT.**

**CLASS 3.**

**CLASS 4**



**CAUTION!**

THIS CUT IS A FAO-SIMILE OF THE STYLE OF HANDLE AND MARKS USED ON ALL OUR CLASS 3 AND CLASS 4 LIFTERS.

Furnished regularly with Set Screw Lock, and with Grip Lock when desired. For Prices, etc., Apply to

Grip Lock.

**J. F. WOLLENSAK, - CHICAGO, ILL.**



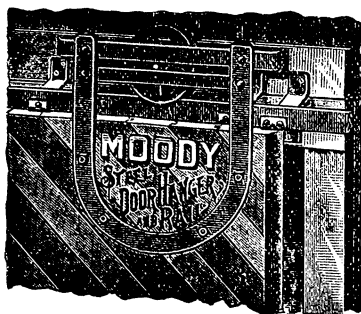
## BUY BRADLEY BRACKETS!!!

Your Customers will like them. They are made of steel and are not brittle. They are light, strong and artistic. They can be put up with nail and hammer. Write for prices.

**ATLAS MFG. CO.,**

New Haven, - - Conn.

## VICTOR MFG. CO., Newburyport, Mass. STEEL RAIL.



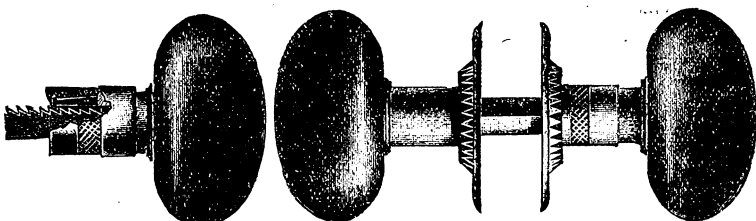
Showing one-half set of hangers attached to door.



The Only Bracing Bracket Made.

| HANGERS.                                | PRICE-LIST. | Per Doz. per. |
|-----------------------------------------|-------------|---------------|
| No. 5, to run 6 feet, 3 1/4 in. wheel,  | -           | \$10.00       |
| No. 6, to run 10 feet, 4 1/4 in. wheel, | -           | 15.00         |
| No. 7, to run 15 feet, 5 1/4 in. wheel, | -           | 22.00         |
| RAIL, per foot.....                     |             | 6 1/2 cents.  |

Sectional cut showing construction of knob.



Half size cut of knob as applied to door. No side screws or adjusting washers.

**The Whipple Patent Door Knob.** Patented Nov. 7th, 1893, other Patents pending. Constructed on an entirely new principle neither expensive nor complicated. Secures perfect adjustment to doors with strength and durability. Use it and avoid the disagreeable end chace and general looseness of the ordinary knob. For Catalogue and Price-List address **THE PERRY & WHIPPLE CO. New Haven, Ct.**

## RICHARD ECCLES,

**AUBURN, N. Y.,**

MANUFACTURER OF

**Finest Carriage Forgings, Couplings, Clips, King Bolts, Fifth Wheels, &c. Manufacture a full line Special Drop Forgings.**

Medal Awarded at World's Fair, Chicago.

Send for New Catalogue for Season 1893-94

**PARTIES DESIRING**

## SUPERIOR QUALITY LIGHT MALLEABLE CASTINGS

(SOMETHING MUCH BETTER THAN THE ORDINARY)

From their own Patterns—Molded True to Pattern—in Quick Time—and at Reasonable Prices—Are Requested to send Samples, stating Quantity Used, to

**WALTER W. WOODRUFF & SONS,**

**MOUNT CARMEL, CONN.**

## WHY USE WOODEN OR HEAVY STEEL BLOCKS

WHEN THE STEEL AND IRON

## TACKLE BLOCKS

—MADE BY—

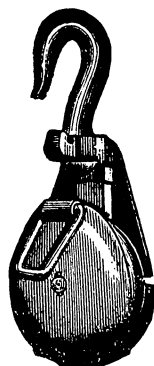
**The Cleveland Block Co.**

**CLEVELAND, OHIO, U. S. A.,**

**ARE BETTER IN EVERY WAY.**

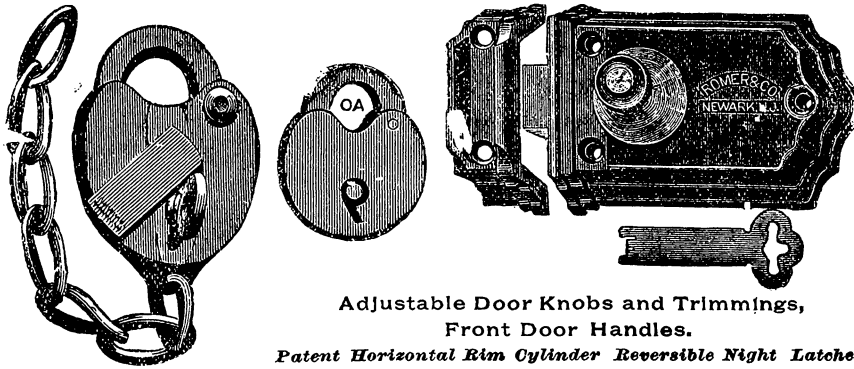
No waste material. Every ounce of weight in the line of strength. No clumsy outside straps or bolts. As light as wooden blocks and vastly more durable. They wear, but never break. Sheaves interchangeable

**General Agents:** Topping Brothers, 92 Chambers Street, New York.  
The H. Channon Co., 22 Market Street, Chicago.  
**New England Agents,** - Dodge, Haley & Co., 212 High Street, Boston.





**ROMER & COMPANY,** Manufacturers of PATENT  
JAIL LOCKS, BRASS and IRON PADLOCKS,

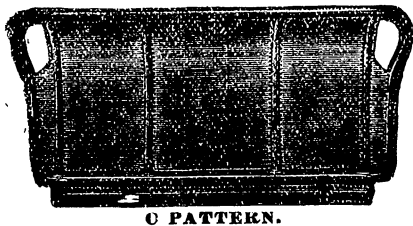


Adjustable Door Knobs and Trimmings,  
Front Door Handles.

*Patent Horizontal Rim Cylinder Reversible Night Latches*

Illustrated Lists sent to the Trade on application,  
275, 277 and 279 Passaic St., near Erie and D. L. & W. R. R. Depots, Newark, N. J.

**McKINNON DASH & HDW. CO.,**  
LIMITED, Manufacturers of



O. PATTERN.

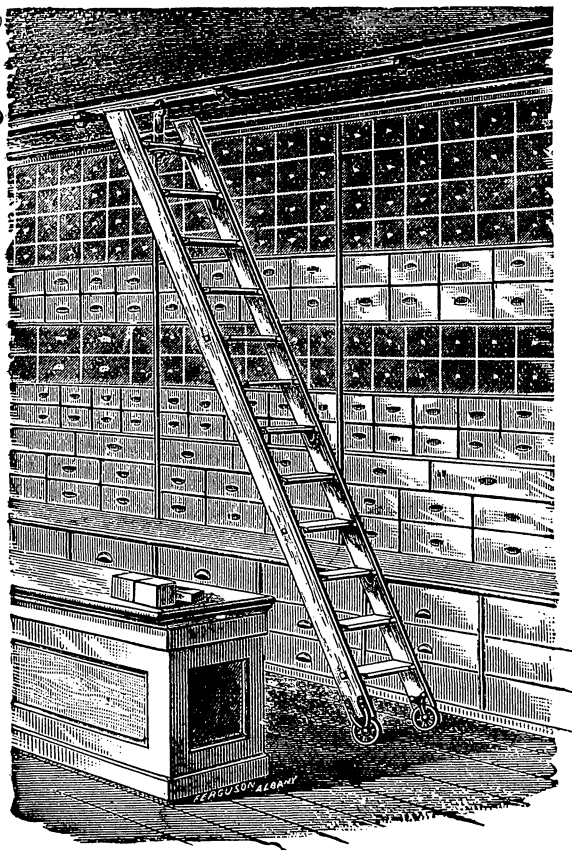
FINE QUALITY  
**DASHES**

AND

**FENDERS,**

SURREY DASH. BUFFALO. - N. Y.

**THE "NOISELESS" STORE LADDER.**



The latest and best. Perfectly noiseless. Neat in appearance

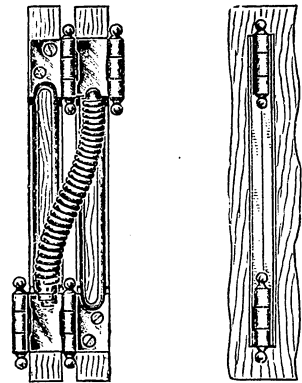
Manufactured by  
**M. CROISSANT,**  
ALBANY, N. Y.

**Vagaries of Sanitary Science.** By F. L. DIBBLE, M.D. The author claims that the whole sanitary movement thus far has no resemblance to scientific investigation. Much sanitary nonsense has been foisted on the people. He submits investigations on air, water, soil, sewer gas, cemeteries, public funerals, meat, milk, filth and fecal diseases, typhoid fever, yellow fever, cholera, diphtheria, epidemics, boards of health and vital statistics. His purpose is to show the true nature of diseases and the means of avoiding them scientifically. 1893. 462 pages, cloth, \$2.00

For Sale by David Williams 96-102 Reade St., N. Y.

**THE WILCOX & HOWE COMPANY,**  
BIRMINGHAM, CONN.,  
MANUFACTURERS OF  
**A Full Line of Carriage Hardware**  
**ALSO SPECIAL FORGINGS.**

Estimates cheerfully given. Send for Catalogue



Highest Award, World's  
Columbian Exposition,

- ON -

**SPRING BUTTS.**

For Catalogue and Prices Address

**CHICAGO SPRING BUTT CO.**

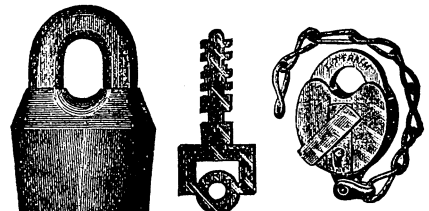
CHICAGO, ILL.,

Or 97 Chambers Street, N. Y.

ESTABLISHED 1879.

**KEYSTONE LOCK WORKS,**

E. T. FRAIM, Lancaster, Pa., U. S. A.



Originators, designers, patentees and manufacturers of all the leading popular styles of **PADLOCKS**, Key-Locking Scandinavian with our patent Inter-Locking Tumblers; the only reliable lock of this style ever made. **SELF-LOCKING** Scandinavian of the highest type of perfection. Dust Proof Railroad, Freight Car and Switch Padlocks. Brass, Bronze, Steel and Malleable Iron Padlocks for all purposes and in all finishes. 131 different kinds. Write for our new 100-page catalogue.

SURPLESS, DUNN & ALDER, General Agents,  
97 Chambers St., NEW YORK.

BUSINESS ESTABLISHED  
1798.

INCORPORATED  
1891.

**JOS. F. McCOY CO.,**

26 Warren St., New York,

Headquarters for

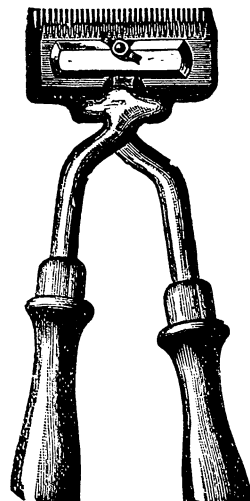
**Coates' Horse Clipper**

AND  
**Barber  
Clippers.**

ALSO  
THE "BELL"  
AND  
THE "COMET"

Horse  
Clippers.

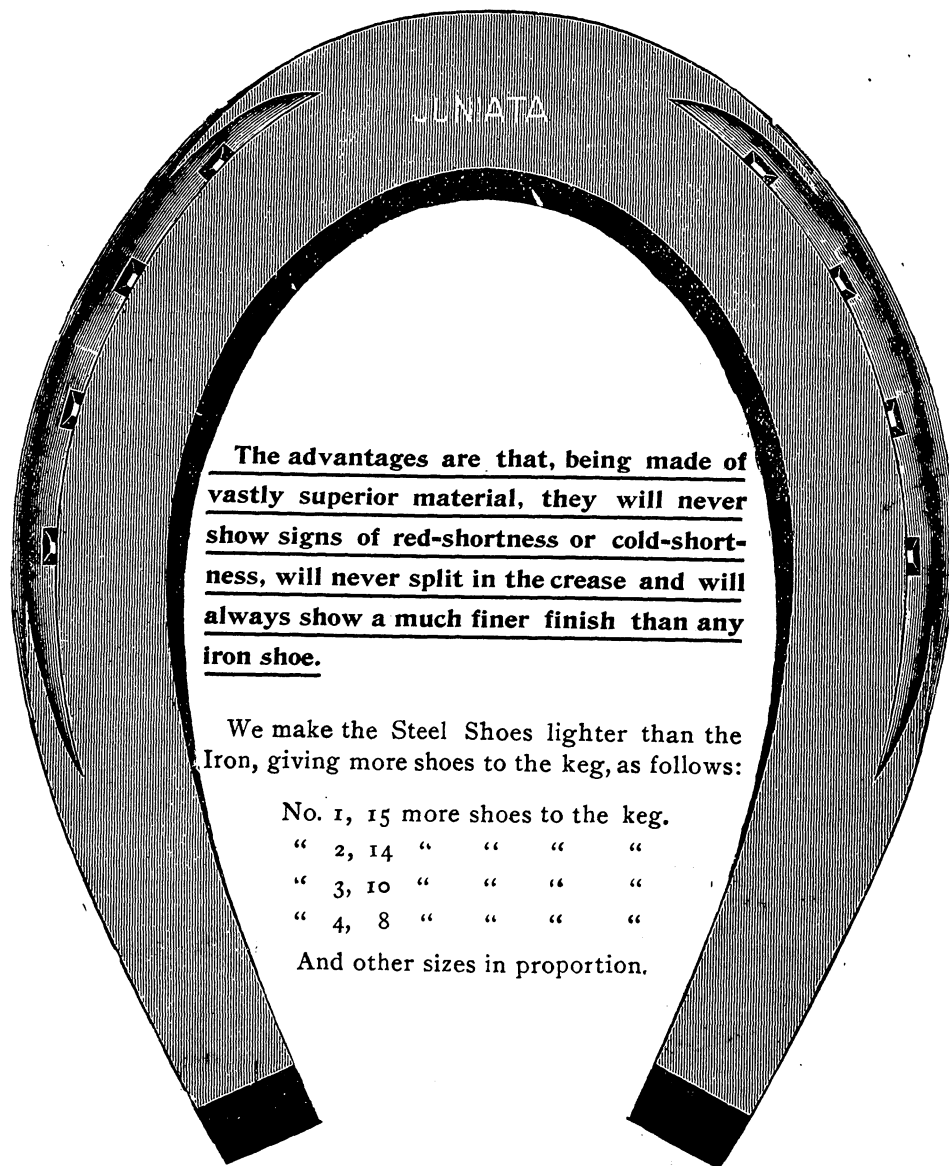
At prices to suit  
the times.



# STEEL HORSE SHOES.

## SHOENBERGER & CO., PITTSBURGH, PA.,

After numerous and costly experiments have succeeded in manufacturing a special quality of soft homogeneous steel, specially adapted to the manufacture of Horse and Mule Shoes, and are now making from this steel Extra Swaged, and Government Pattern Horse and Mule Shoes. They give the best of satisfaction everywhere, and we furnish them to the trade at the same prices as the regular iron shoe sold by ourselves and our competitors. We are at present making our Roadster Pattern Horse Shoes out of Iron, but we will make them of Steel also within a short time.



The advantages are that, being made of vastly superior material, they will never show signs of red-shortness or cold-shortness, will never split in the crease and will always show a much finer finish than any iron shoe.

We make the Steel Shoes lighter than the Iron, giving more shoes to the keg, as follows:

No. 1, 15 more shoes to the keg.

" 2, 14 " " " "

" 3, 10 " " " "

" 4, 8 " " " "

And other sizes in proportion.

**No. 2 EXTRA SWAGED FRONT.**

We also beg to say that we have introduced improved machinery into our new factory and have doubled our capacity, and are now prepared to furnish the best shoe, either iron or steel, ever offered to the trade.

We would also call your attention to our Improved Steel Toe Calk, equal to any in the market. To secure the best wearing qualities use sand or borax in welding on a calk and cool off at a dark red, or still better, cool off without plunging in water. We make sizes numbers 1, 2, 3, 4, 5 and 6, packed in 25-pound boxes.

Write to us for information and prices, or apply to jobbers and dealers, who sell them everywhere.

## SHOENBERGER & CO.,

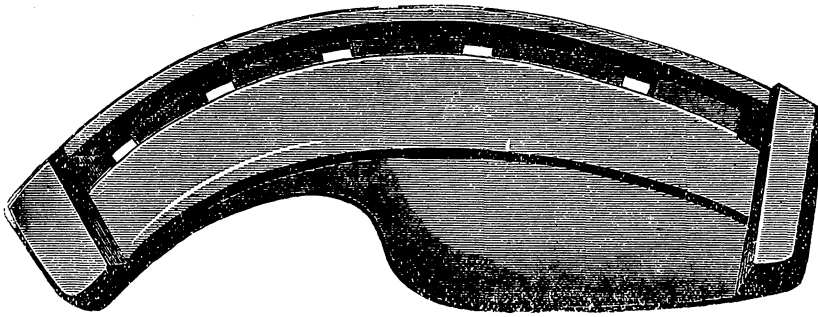
JUNIATA IRON AND STEEL WORKS, - - - PITTSBURGH, PA.

# SCRANTON FORGING CO.,

SCRANTON, PA

## CARRIAGE HARDWARE AND SPECIAL DROP FORGINGS.

FORGED  
OX  
SHOES.



Made under Deebie's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.



## HORSE AND MULE SHOES.

Superior Quality, Shape and Finish.

BRYDEN HORSE SHOE CO.,

CATASAUQUA, PA.

RHODE ISLAND PERKINS HORSE SHOE CO.,  
MANUFACTURERS OF

### Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES:—X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.

Works at Valley Falls, R. I.

Office, 31 Exchange Place, Providence, R. I.

F. W. CARPENTER, Pres.,

C. H. PERKINS, Gen. Manager,

R. W. COMSTOCK, Sec'y,

CHARLES R. STARK, Treas.

J. C. McCARTY & CO., Agents - 97 Chambers Street, New York.

## THE NEW DIAMOND STATE HORSE AND MULE SHOES.

JUST TRY THEM and YOU will say they excel all others.

MANUFACTURED BY

## DIAMOND STATE IRON CO.

WILMINGTON, DELAWARE.

Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blank Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.

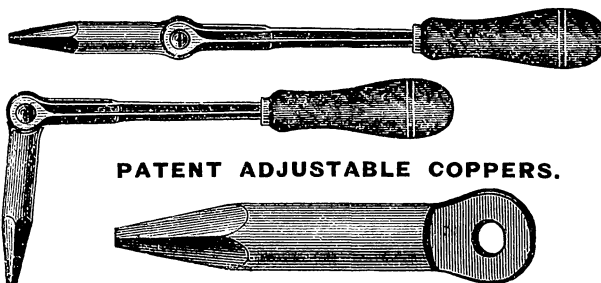
PHILADELPHIA OFFICE,  
206 So. Fourth St.

{ Correspondence invited }

NEW YORK OFFICE,  
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## Covert Pat. Adjustable Soldering Irons AND Coppers

It is a complete tool in every respect and can be as easily adjusted at angle while hot as cold. The handle can be used indefinitely, as when the copper is worn out it can be replaced in the same handle, making the iron as good as new at about half the cost of the ordinary soldering iron.



PATENT ADJUSTABLE COPPERS.

A sample of  $\frac{3}{4}$  in. soldering iron will be sent by mail, free of postage to any address, on receipt of sixty cents (60c.).

FOR SALE BY ALL GENERAL HARDWARE AND PLUMBERS' SUPPLY HOUSES.

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## BURDEN'S

## HORSE SHOES.

"Burden Best"

Iron

Boiler Rivets.

## The Burden Iron Co.

TROY, N. Y.

## PHOENIX

## HORSE SHOES.

PHOENIX HORSE SHOE CO.,

Poughkeepsie, N. Y.

NEW YORK OFFICE, No. 66 Reade St.

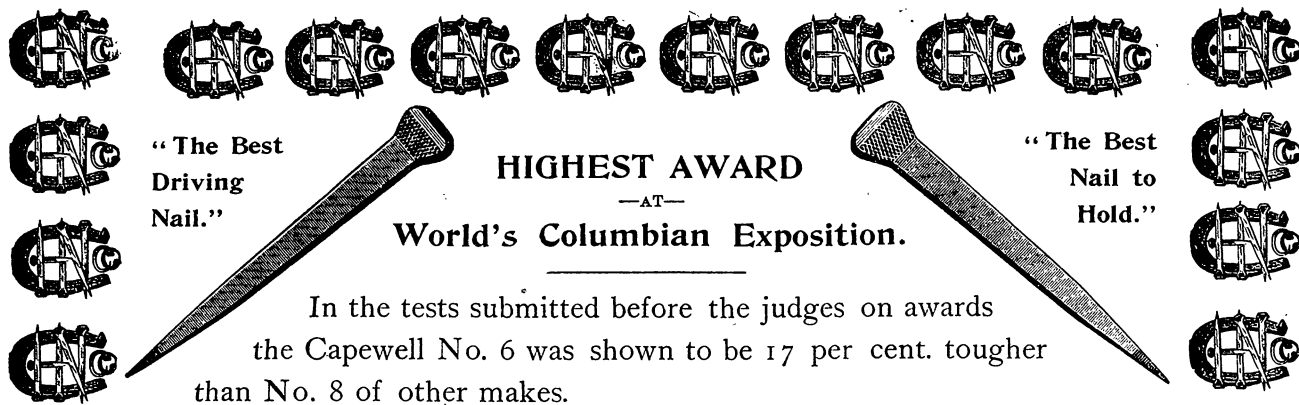
## Standard Horse Shoe Co.,

Manufacturers of

## HORSE AND MULE SHOES.

LEEDS, ROBINSON & CO., General Agents,

4 Liberty Square, Boston, Mass.



“The Best Driving Nail.”

**HIGHEST AWARD**  
—AT—  
**World's Columbian Exposition.**

In the tests submitted before the judges on awards the Capewell No. 6 was shown to be 17 per cent. tougher than No. 8 of other makes.

“The Best Nail to Hold.”



**CAPEWELL HORSE NAILS,**  
—MADE BY—  
**THE CAPEWELL HORSE NAIL CO., - - - HARTFORD, CONN.**

Office of D. G. BURNHAM,  
Director of Works, World's Columbian Exposition,  
JACKSON PARK, CHICAGO, ILL.

October 28, 1893.

To THE CAPEWELL HORSE NAIL CO.:  
Gentlemen—I have used your horse nails here on the horses' belonging to the World's Columbian Exposition, and I think they are far superior to any others that I have ever used. As I have been in the horseshoeing business for about twenty-five years, I know what I am talking about.

Very respectfully,  
HERMAN J. HENKE,  
Foreman Blacksmith, World's Columbian Exposition.

The Capewell Patent Corrugated Horse Nail.

Needs No Clinching.

# Highest Award

FOR

## Supreme Excellence

TO

The **PUTNAM** Hot-Forged and  
Hammer-Pointed Horse **NAILS,**



At the *World's Columbian Exposition* at Chicago. A medal and diploma worded:  
“Supreme excellence in material, method in manufacture, and quality of finished product; elasticity and smoothness combined with holding power in clinch.  
It allows the use of very small nails.”

There is nothing beyond “supreme excellence,” nor is there anything comprised in a horse nail, except the “material from which it is made,” “the method of manufacture,” and “quality of finished product.” Putnam nails, by their “elasticity,” give slightly to the expansion and contraction of the hoof while the horse is in motion; by their “smoothness,” do not enlarge the nail holes in the hoof, while their “supreme excellence,” in “holding power in the clinch,” enables them to hold the shoe in the hardest service until worn out.

By the “use of small nails,” large holes are avoided and money saved to the smith. Thus it will be seen that the officials of the *World's Columbian Exposition* recognize what qualities go to make up a good horse nail and that only the “Putnam” contains them all.

**PUTNAM NAIL CO.,**  
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# H. D. SMITH & CO.,

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MANUFACTURERS OF THE BEST QUALITY

## CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

# FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of

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All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents. New York.



Elegant Iron.

Beautiful Shape.

HORSE SHOES,  
*Light, Medium and Heavy.*

MULE SHOES,  
*Light, Medium and Heavy.*

Illustrated booklet and prices to all parts of the world on application.

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ARTHUR B. CLARKE, President.

Chicago Office, 45 La Salle St.

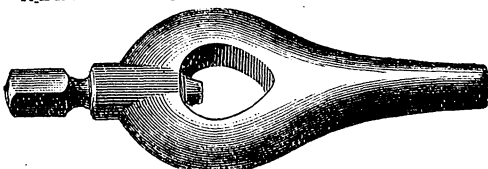
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## LE COUNT'S STRAIGHT TAIL DOG,

WITH STEEL SCREWS.

U. S. Standard, and the points hardened. To be driven from a stud in the face plate.


It is from the same pattern as the Heavy Steel Dog, and warranted, like that, not to break with any work.



This pattern will stand much more than a bent tail, and some prefer them on account of their direct action on the work.

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These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St., London, England.

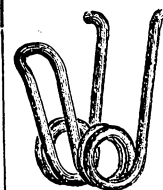


**P. F. BURKE, C. F. DEWICK & CO.**  
Manufacturers of  
**PATENT STEEL**  
(Blunt and Sharp)  
**TOE-CALKS.**  
—ALSO—  
**BURKE'S IMPROVED**  
**HORSESHOERS'**  
**FOOT VICE.**  
Send for Circulars.  
360 Dorchester Av. Dis for Welding  
BOSTON, MASS. Sharp Calks.

**Crescent**  
**Horse and Mule Shoes,**  
**BAR IRON.**

**CRESCENT HORSE SHOE**  
**IRON CO.**

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**FROST'S ANTI-RATTLER**

Pat. Jan. 20, 1880.

Cut One-half Size.  
Sample pair sent to any hardware or saddlery firm by addressing

The Frost Thill Spring Co.,  
Boston, Mass.

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**"CONROY"**  
**Refrigerator Door**

**Fasteners**

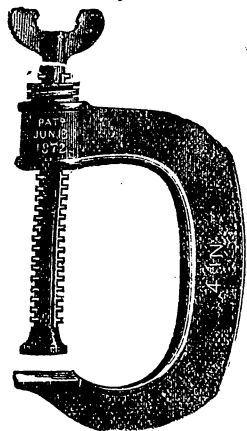
Have rapidly supplanted all others.

Refrigerator Trimmings

Pat. Dec. 15 '85

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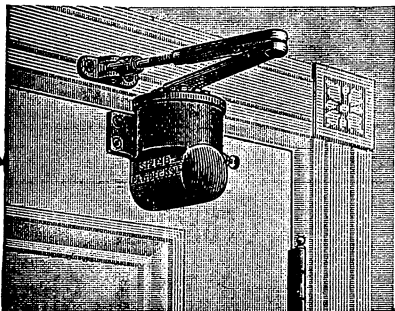
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**MALLEABLE IRON**  
Hammer's Adjustable Clamps.



**Hammer's** Malleable Iron Oilers, 3 Sizes.  
Malleable Iron Hand Lamps.  
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**NEW** pattern Heavy Screw Clamps.  
Strongest in the market.  
For sale by all the principal Hardware dealers.  
Send for Price List.

**MALLEABLE IRON CASTINGS**  
of superior quality and Hardware Specialties  
in Malleable Iron made to order.

**HAMMER & CO.,**  
Branford, Conn.



**Bardsley's Liquid Door Check and Spring**  
Perfect in action, durable, neat in appearance, low  
in price and fully warranted. Responsible Agents  
wanted in the principal cities.

**J. BARDSLEY, 149 & 151 Baxter St., New York.**

**HARDWARE DEALERS**

CAN RECOMMEND THE

**CHAMPION METAL WINDOW  
SASH CHAINS**

to their customers as a reliable substitute for  
Sash Cords, very strong and lasting (some in  
daily use ten years), and gives thorough satis-  
faction wherever used. The patented attach-  
ments are very simple and can be applied to  
any window.

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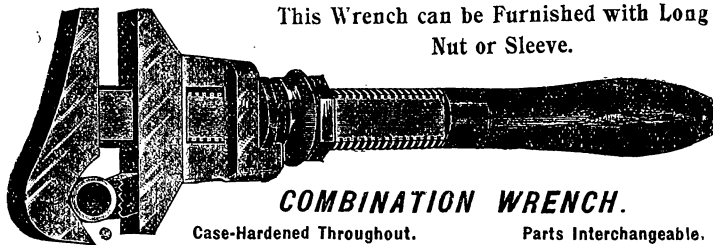
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By H. C. STANDAGE. A treatise containing 750 re-  
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For Sale by DAVID WILLIAMS, 96-102 Reade St., N.Y.



This Wrench can be Furnished with Long  
Nut or Sleeve.

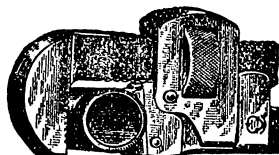
**COMBINATION WRENCH.**

Case-Hardened Throughout.

Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the  
requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.  
For Circulars and Price-List, address

**BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass., U. S. A.**



**TRIMO PIPE WRENCH,**

Forged Steel

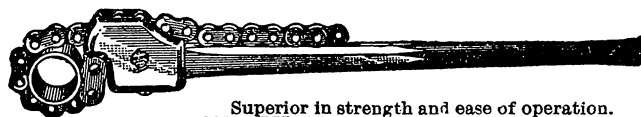
All parts interchangeable.

Grips firmly without loss of motion. Releases readily. Never locks. Causes no  
trouble in close quarters. Does not crush the pipe.

**TRIMO**

**CHAIN  
PIPE**

**WRENCH.**



Superior in strength and ease of operation.  
COMPLETE circular grip. Never slips nor crushes.

Can be used with one  
hand and in closer quarters  
than any other Basin  
Wrench. Parts Interchange-  
able.

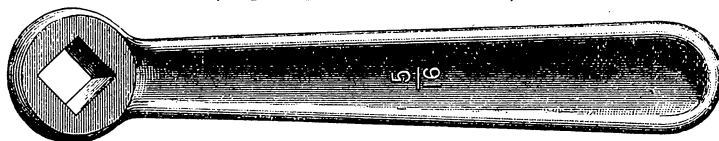


**TRIMO  
BASIN WRENCH.**

**TRIMONT MFG. CO., ROXBURY  
MASS.**

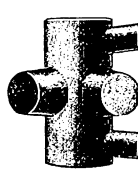
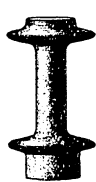
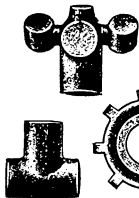
**DROP-FORGED STEEL BOX WRENCHES.**

Ten Sizes; Openings from 1/4 in. to 1 in., inclusive.



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Engineers' and Set Screw Wrenches, Lathe-dogs, Brock's Patent Drop-forged Chain Pipe  
Wrench, Collars, Thumb Screws, Keys, Special Drop-Forgings.



**WYMAN & GORDON**  
WORCESTER, MASS.  
**DROP FORGINGS**

*Billings' Drop Forged Lathe Dogs*



Drop Forged from Best Bar Steel,  
and warranted a first-class  
article.

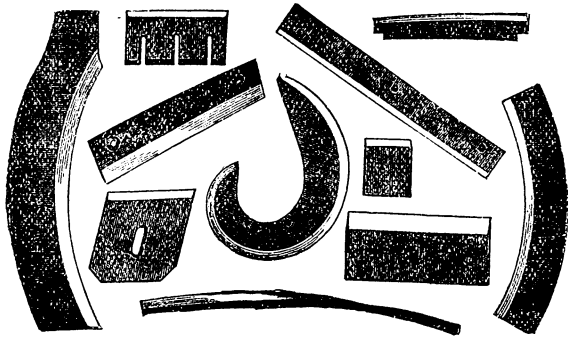
CLAMP AND DIE DOGS OF THE SAME HIGH QUALITY

**THE BILLINGS & SPENCER CO. - - Hartford, Conn.**

Drop Forgings of Every Description.

**London House: Chas. Churchill & Co., 21 Cross St., Finsbury.**





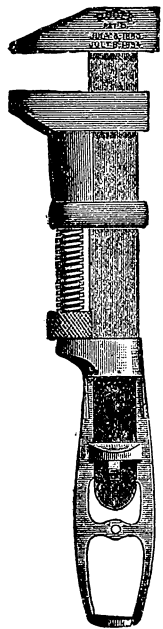
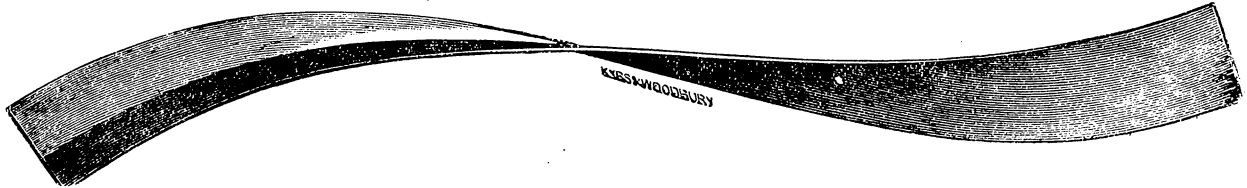
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Manufacturers of **MACHINE KNIVES.**

Shear Blades and Strips, Moulding Cutter Plate, Die Stock for Leather, Cloth and Paper Cutting Dies. Lawn Mower and Hay Cutter Knives of every description.

End view of Plated Stock for Dies, Lawn Mower Knives, Blades Etc., showing how the Steel is laid.



## L. COES'

Genuine Improved  
**KNIFE HANDLE  
PATENT**

## Screw Wrenches

MANUFACTURED BY  
**COES WRENCH CO.,**  
WORCESTER, MASS.

Established in  
1839.  
Registered  
March 31, 1874.

Patented July  
6, 1880.  
Patented July  
8, 1884.

Sectional View Illustrates our New Knife Handle, showing Malleable Iron Frame and Shank of Bar keyed into position.

✓ Straight Bar, Extra Long Nut for Screw in Jaw. ✓

**The BEST MADE and STRONGEST WRENCH in the MARKET.**

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FOR ANTHRACITE AND  
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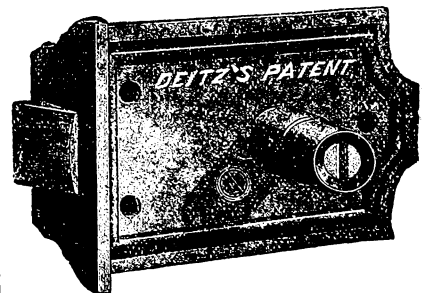
6  
DIFFERENT  
STYLES  
OF SPOUTS.

SAMPLE 15¢.

SEAMLESS  
BRASS  
COLLAR  
BRASS HINGE  
Lid Solid  
No SOLDERING

B. E. LEONARD, Scranton, Pa.

## A. E. DEITZ



No. 109 Latch.

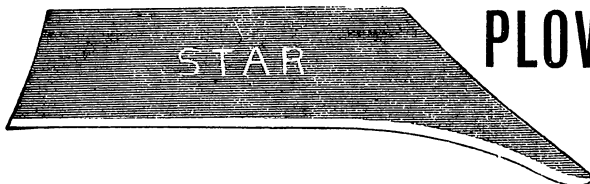
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Factory, **BROOKLYN, E. D., N. Y.**

## STAR MANUFACTURING CO.,

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## PLOW SHARES.

Plow Moldboards,  
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Lister Shares, Fin Cutters, Cultivator Shovels, Cultivator Shovel Points, Plow Points, Screw Coulter Hubs.

Mention IRON AGE.

## THE ART OF SELLING.

By F. B. GODDARD.

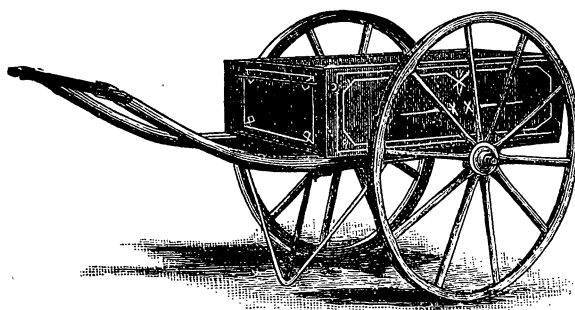
12mo, Flexible Cloth, 50 Cents.

In this book the author lets the reader into the secrets of the accomplished and successful salesman, illustrates his tact and finesse, and tells how he masters men: but beyond this, the work embraces much information which will be instructive and useful to all classes of business men. Besides suggestions to buyers, it contains chapters on "Changes in Business Conditions and Methods," "Salesmen's Compensation," "Retail Merchants and Salesmen," "Saleswomen," "How to Read Character," with a collection of clearly and tersely put important Legal Principles and Decisions Governing Sales. Sent, post-paid, upon receipt of price, by

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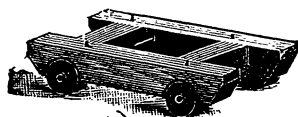
# HAND CARTS AND TRUCKS.



**HAND CART.**

Carts of this kind are growing in popular favor daily. They should be kept in stock by every hardware dealer. Painters, Carpenters, Bill Posters, Masons, etc, find that they are ahead of anything else for carrying tools and light material. Farmers, too, use them to good advantage about the orchard or garden. Box easily adjustable. Handles on Carts No 0 are not bent. Made with springs or third wheel if desired.

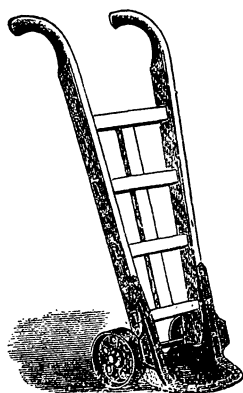
|            | Telegraph Name. | Diam. of Wheels. | Tread of Wheels.   | Diam. of Axle.     | Size of Box. | Depth of Box. | Weight, Each. | Packed for export— one doz. measures. | List Price. Each. |
|------------|-----------------|------------------|--------------------|--------------------|--------------|---------------|---------------|---------------------------------------|-------------------|
| No. 0..... | Badger          | 42 in.           | 1 in.              | 1 in.              | 48 x 28 in.  | 10 in.        | 100 lbs.      | 95 cu. ft.                            | \$10.50           |
| No. 1..... | Balcony         | 36 in.           | 1 in.              | $\frac{7}{8}$ in.  | 40 x 23 in.  | 10 in.        | 90 lbs.       | 88 cu. ft.                            | 9.00              |
| No. 2..... | Ballast         | 30 in.           | $1\frac{1}{2}$ in. | $1\frac{1}{8}$ in. | 32 x 20 in.  | 9 in.         | 80 lbs.       | 70 cu. ft.                            | 8.25              |



**BOX TRUCK.**

With  $4\frac{1}{2}$  inch wheels,  $1\frac{1}{2}$  inch face. Turned axles. Size 16 x 24 inches. Other sizes made to order. A handy truck for moving heavy boxes.

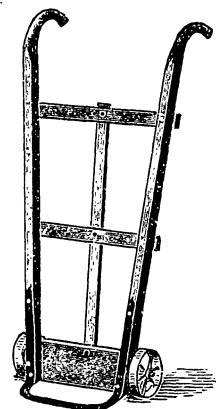
**"No. 50" BAG TRUCK.**



**CAST NOSE, TURNED BEARINGS.**

Length, 42 in.; width at nose,  $11\frac{1}{4}$  in.; diameter of wheels, 6 in.; weight, each 20 lbs. Telegraph name, Adverb For export, measure 6 cu. ft. per doz.

**DANDY BAG TRUCK.**



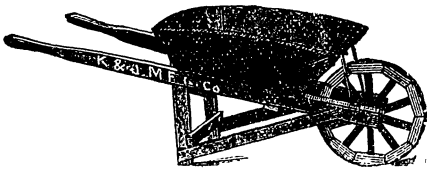
**WROUGHT IRON NOSE. TURNED BEARINGS.**

Length, 42 in.; width at nose, 11 in.; diameter of wheels, 6 in.; weight, each, 19 lbs. Telegraph name, Abandon. For export, measure 6 cu. ft. per doz.

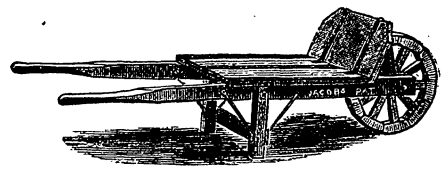
Write for prices of Barrows, Carts or Warehouse Trucks to

# LANSING WHEELBARROW CO.,

LANSING, MICH.



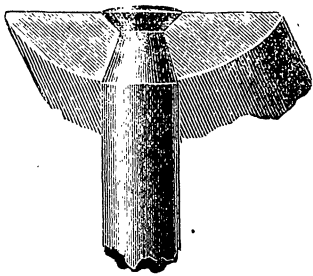
**Dealers!**  
**Don't Forget**



What we said about our goods last week. They comprise the best and largest variety in the world, which we offer at prices satisfactory to you.

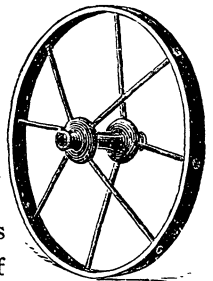
**THE KILBOURNE & JACOBS MFG. CO., COLUMBUS, OHIO, U. S. A.**

**THE WHEEL'S  
THE THING.**



All of The Toledo Wheelbarrows are fitted with the Thomas Wheel. Note its construction; therein lies the popularity of our Wheelbarrows. They are also superior in many other ways. Write for prices.

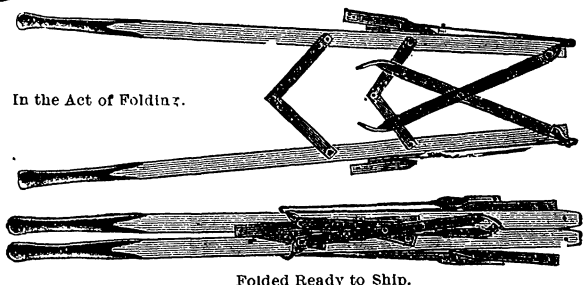
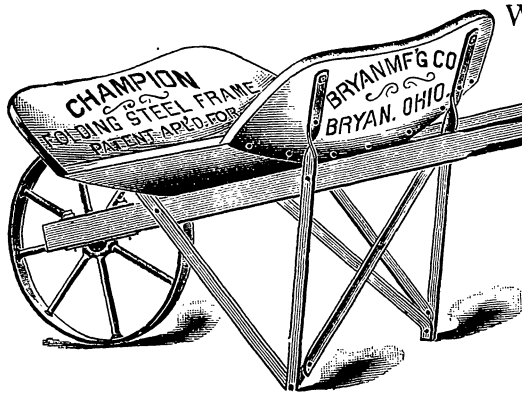
**THE TOLEDO WHEELBARROW WORKS, TOLEDO, O.**



# What's the Difference

between the Champion and other Barrows? If you will scrutinize the illustrations below you will perceive most of the "difference." It's the only Barrow that can be knocked down and stored in space of 3 x 5 x 60 inches. There isn't a single weak point in its entire construction and all things considered, is the cheapest Barrow on the market made with wood or metal tray.

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A practical means of rapidly reaching absolutely accurate results without the mental wear of computing.

**LADD'S DISCOUNT BOOK.**

It gives at a glance the net of any sum at a great range of discounts, simple and complex, and it is accurate, rapid and practical. Price, \$3.00; Double Indexed Edition, \$4.00.

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**ALL STEEL WHEELBARROWS & SCRAPERS**

MANUFACTURED BY

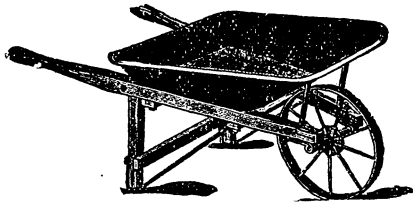
**AMERICAN STEEL SCRAPER CO.**

1104 Court Street, SIDNEY, O.



Write for  
Catalogue

# STRANGE GOODS



are received with distrust usually. In this respect we've been peculiarly fortunate with our productions. They take wherever placed, owing altogether to their general excellence.

WERE YOU AWARE OF THIS?

**Sidney Steel Scraper Co.,** 924 Poplar Street, **SIDNEY, OHIO.**

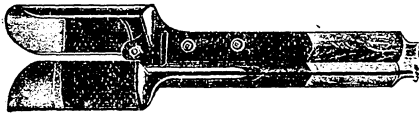
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OFFICE AND WORKS:  
234 to 240 Eleventh St., JERSEY CITY, N. J.

**NEW CONCRETE MIXING MACHINES.**

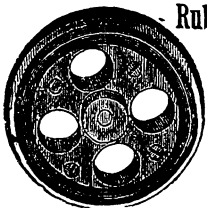
Coal and Ash Buckets, Coaling Tubs, Coal and Coke Cars, Patent Tubular Frame Wheelbarrows, Furnace Charging Barrows and Cars, Sheet Iron Work of every description, Patent Power Punching Machines, Every Description of General Forgings, Dimpfel Blowers, Machine Work

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**F. E. KOHLER & CO.,**  
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**Rubber and Iron Wheels**

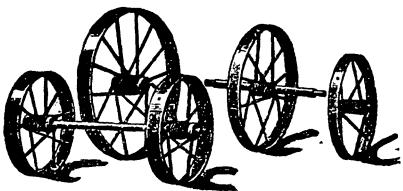
Casters for Trucks,  
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Heavy Casters for  
Mill use.

Catalogues free.

G. P. CLARK, Box 0,  
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**WHEELS. WHEELS. WHEELS.**

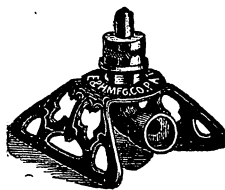


The best there is made for Wheelbarrows and Trucks. Send for Circular and Prices.

Address

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Mention *The Iron Age* New London, Ohio

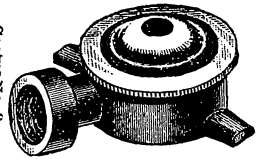


Japanese No. 12,  
Adjust.

**LAWN  
SPRINKLERS.**

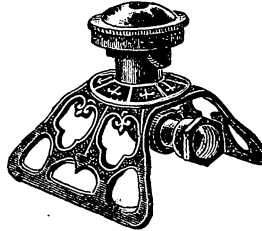
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CHEAPEST Lawn Sprinklers in  
the World.

Cactus No. 8.



The only Sprinklers which have no revolving parts to leak or wear out. The only Sprinklers free from small holes, and which cannot become clogged with gritty substances. The only Sprinklers which are adjustable and will give a spray as fine as the mist of Niagara, or as heavy as the area of the supply pipe.

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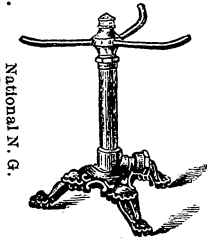


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**Ette & Henger Mfg. Co.**

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National N. G.

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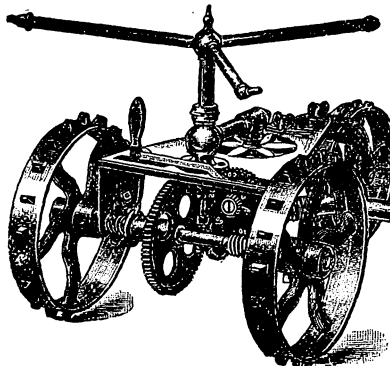
**Traveling Lawn Sprinkler.**

**PATENTED.**

Can be set to travel anywhere from 15 to 500 feet per hour, either on a straight line or in a circle, and can be gauged to throw water over a swath 5 to 50 feet in width.

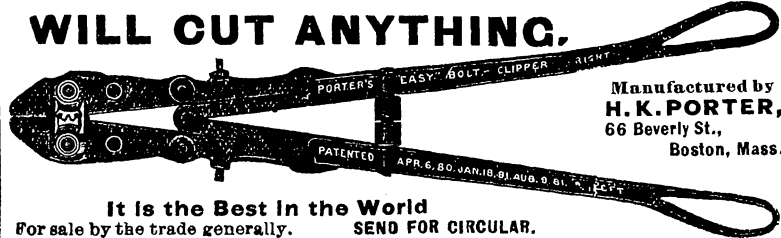
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**THE "EASY" BOLT CLIPPER.**  
**WILL CUT ANYTHING.**



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It is the Best in the World  
For sale by the trade generally. SEND FOR CIRCULAR.

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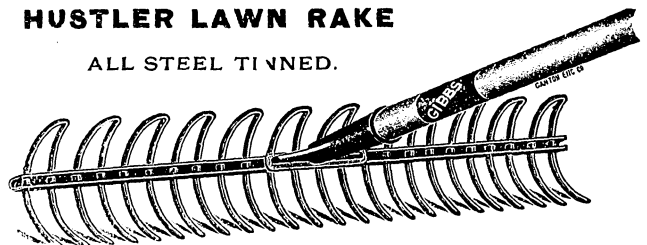
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ALL STEEL TINED.



Lawn Rakes, Garden Rakes,  
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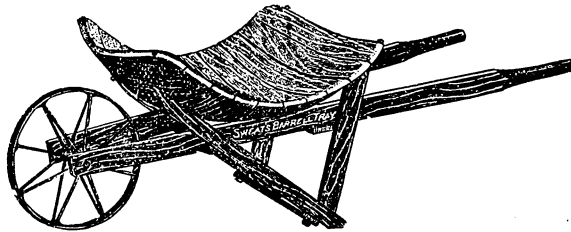
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Its structure is **NOVEL, STRONG** and **ENDURING**. Barrel Tray, Bolted frame, Hubbard's Patent Steel Wheels.

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**"QUEEN  
B"**



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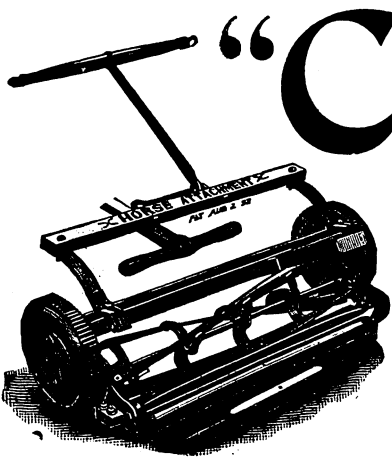
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THE ONLY FIRST-CLASS COMBINATION MOWER ON THE MARKET. PRICES LOW, TERMS REASONABLE.

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## Genuine Philadelphia Lawn Mowers.

— Highest Award at the Field trial, World's Fair, Chicago, 1893. —

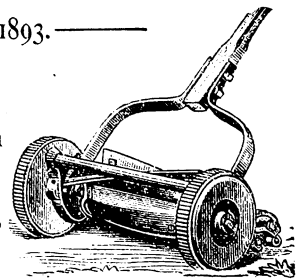
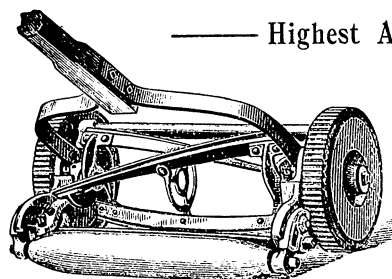
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WORLD'S COLUMBIAN COMMISSION.

OFFICE OF THE

Director-General of the Exposition.

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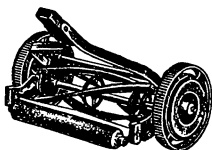
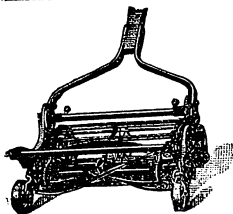
J. M. SAMUELS,

Chief Dept of Horticulture

3  
HIGHEST  
AWARDS.

NO ONE  
RECEIVED  
HIGHER,  
BETTER OR  
MORE  
PREMIUMS.

Imperial, High Wheel, Standard, New York, Horse Mower.

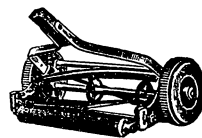
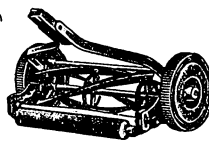


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in the market is yours for the asking.

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## BEST HIGH GRASS.

This is a strictly **High Grass Mower**, although it will cut short grass equal to a light Mower, and is very light draft, considering the weight.

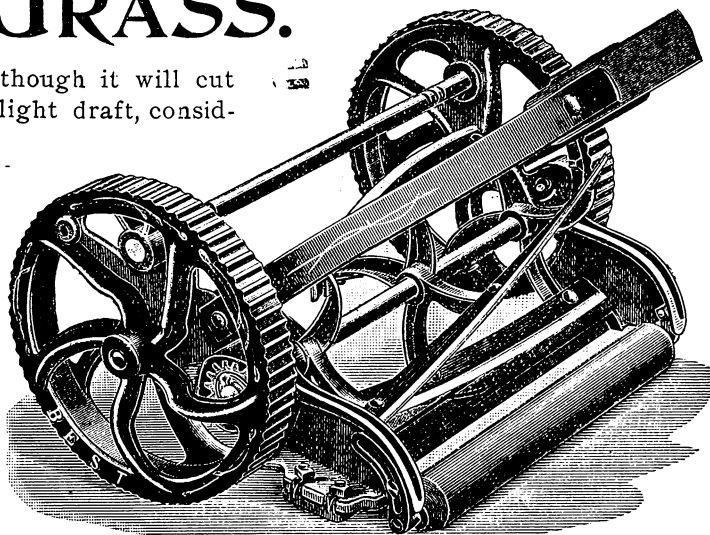
The wheels are 10½ inches diameter, reel 8 inches diameter, and will cut grass 10 inches high.

The reel boxes are brass, and self-aligning; every part of the Mower is easy of access to oil or adjust.

The connection is on the same principle as all others of our make, except ¼ shaft is used, instead of ⅝ shaft. This is a nice looking Mower.

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All of Which are First-Class in Quality  
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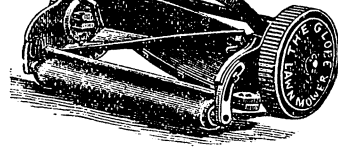
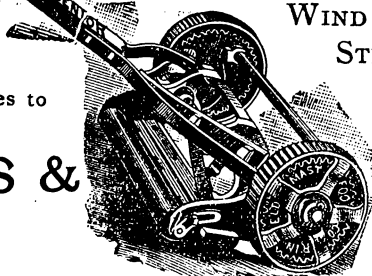
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# And Now The Continental Lawn Mower!

Not an ounce

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in its construction.

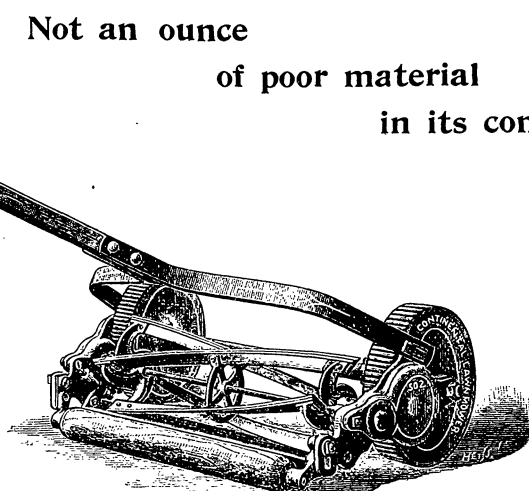
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Highest Medal and Diploma at  
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SHOWING STYLE OF LOW WHEEL.

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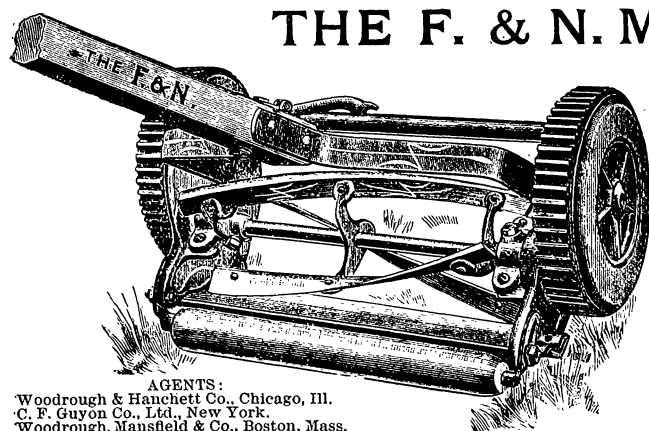
Every one worked to entire satisfaction of the managing officials, who give the highest possible testimonials.

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Grass Catchers,  
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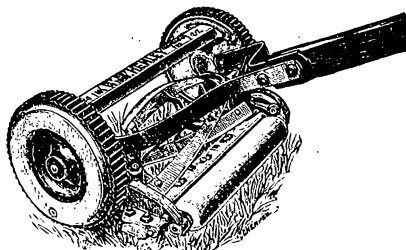
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For Lawns and Parks

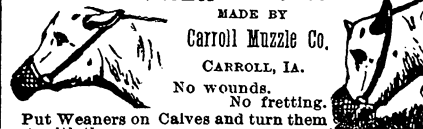
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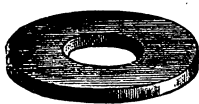
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Carroll Muzzle Co.  
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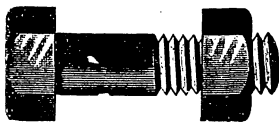


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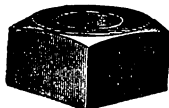
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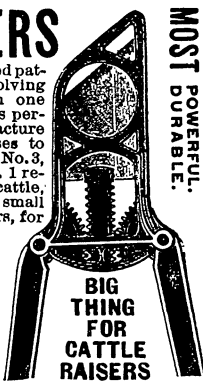


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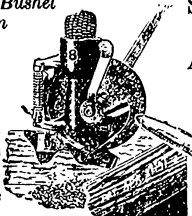
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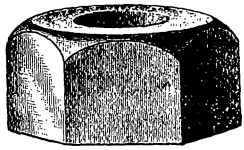
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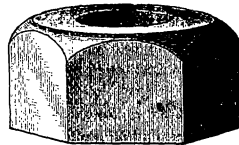
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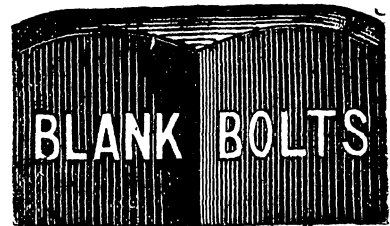
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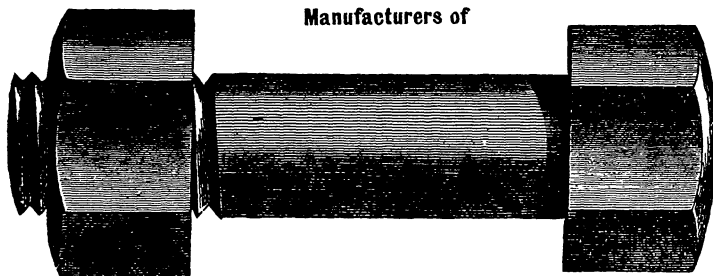
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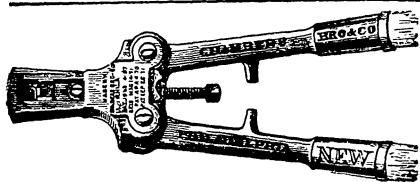
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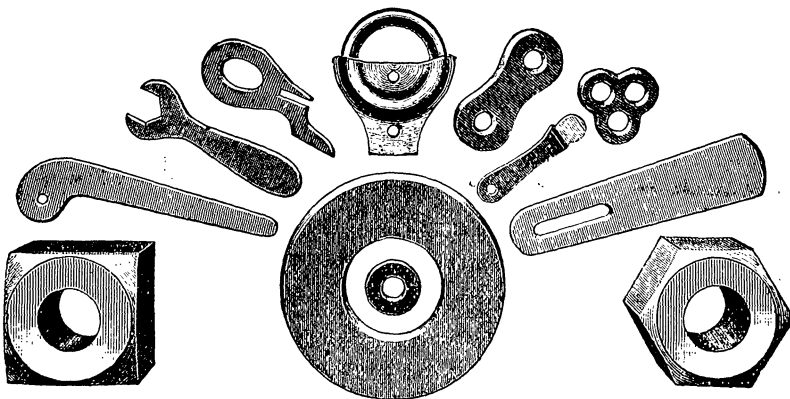
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Seovill Mfg. Co., Waterbury, Conn.

**Aluminum, Brass and Bronze.**  
Sayford, F. L. Co., Ansonia, Conn.  
Haight & Clark, Albany, N. Y.  
Pratt & Cady Co., Hartford, Conn.  
St. Louis Bronze & Aluminum Works, St. Louis, Mo.

**Analytical Chemists.**  
Britton, J. Blodgett, Philadelphia, Pa.  
Moore, Dr. Gideon E., 221 Pearl St., N. Y.

**Anti-Friction Metals.—See Babbitt Metal**

**Anti-Window Rattlers.**  
Henry, J. T. Mfg. Co., Hamden Conn.

**Anvil and Vise (Combination).**  
Fulton Iron & Engine Works, Detroit, Mich.

**Anvils.**  
Eagle Anvil Works, Trenton, N. J.

**Apple Parers.**  
Goodell Co., Antrim, N. H.

**Arms and Ammunition.**  
Harrington & Richardson Arms Co., Worcester, Mass.  
Harley & Gramam, 313 & 315 Broadway, New York.

**Arms and Ammunition.**  
Ideal Mfg. Co., New Haven, Conn.  
Stevens, J., Arms and Tool Co., Chicopee Falls, Mass.  
Union Metallic Cartridge Co., 313 & 315 Broadway, N. Y.

**Auctioneers.**  
Bissell, E. Son & Co., N. Y.

**Augers and Bits.**  
Snell Mfg. Co., 72 Reade St., N. Y.  
Syracuse Twist Drill Co., Syracuse, N. Y.

**Axes.**  
Amer. Axe & Tool Co., 280 B'way, N. Y.  
Main Edge Tool Co., Lewiston, Pa.  
Peck, A. G. & Co., Cohoes, N. Y.  
Standard Axe & Tool Co., Ridgway, Pa.

**Axles, Springs, &c., Manufacturers of.**  
Gaudier Steel Dept. of Cambria Iron Co., Johnstown, Pa.  
Wurster, F. W. & Co., Brooklyn, N. Y.

**Babbitt Metal.**  
Bridgeport Deoxidized Bronze & Metal Co., Bridgeport, Conn.  
Crown Smelting Co., Chester, Pa.  
Hertz, T. & Son, St. Louis, Mo.  
Keys, W. W. & R. M. Co., Bridgeport, Conn.  
Reeves, Paul S., Philadelphia, Pa.

**Bakers and Roasters.**  
Bronson Supply Co., Cleveland, Ohio.

**Sale Ties.**  
Kilmer Mfg. Co., Newburg, N. Y.

**Band Saw Machines.**  
Cross & Speltz Machine Co., Waterbury, Conn.

**Barb Wire and Fence.**  
Gaudier Steel Dept. of Cambria Iron Co., Johnstown, Pa.  
Indiana Wire Fence Co., Crawfordsville, Ind.  
Kilmer Mfg. Co., Newburg, N. Y.  
Ludlow-Saylor Wire Co., St. Louis, Mo.  
Washburn & Moen Mfg. Co., Worcester.

**Bar Iron, Manufacturers of.**  
Atma-Standard Iron & Steel Co., Bridgeport, Conn.  
Allentown Rolling Mill, Allentown, Pa.  
Burden Iron Co., Troy, N. Y.  
Crescent Horse Shoe & Iron Co., Max Meadows, Va.  
Montour Iron & Steel Co., Danville, Pa.  
Mahoning Valley Iron Co., Youngstown, Ohio.  
Sternbergh, J. R. & Son, Reading, Pa.

**Bellevue, Manufacturers of.**  
Bullock Bellevue Co., Cleveland, O.  
Scott, Geo. M., Chicago, Ill.

**Bells.**  
Bevin Bros. Mfg. Co., East Hampton.

**Belt Dressing.**  
Jos. Dixon Crucible Co., Jersey City, N. J.

**Belt Fasteners.**  
Bristol Co., Waterbury, Conn.  
Claffen Mfg. Co., Cleveland, Ohio.  
Talcott, W. O., Providence, R. I.

**Belting, Makers of.**  
Alexander Bros., 413 N. 3d., Phila.  
Jeffrey Mfg. Co., Columbus, O.  
Link-Belt Engineering Co., Phila., Pa.  
Main Belting Co., Philadelphia, Pa.  
N. Y. Belting & Packing Co., Ltd., N. Y.  
Roberts Mfg. Co., Pittsburgh, Pa.  
S. Stanley Works, New Britain, Conn.

**Belting, Manufacturers of.**  
Wickes Bros., Saginaw, Mich.

**Bicycles and Bicycle Sundries.**  
Bevin Bros. Mfg. Co., E. Hampton, Mass.  
Bridgeport Gun Implement Co., 313-315 Broadway, New York.

Bronson Supply Co., Cleveland, O.  
Eagle Bicycle Mfg. Co., Torrington, Ct.  
Grand Rapids Cycle Co., Grand Rapids, Mich.

Haines & Zimmermann, 407 Cherry Street, Philadelphia.  
Heath, S. F. Cycle Co., Minneapolis, Minn.

Indiana Bicycle Co., Indianapolis, Ind.  
League Cycle Co., Hartford, Conn.  
Lovell, Jno. P. Armory, Boston, Mass.  
Monarch Cycle Co., Chicago, Ill.

Pierce, Geo. N. & Co., Buffalo, N. Y.  
Pope Mfg. Co., Boston, Mass.  
Read, Wm. & Sons, Boston, Mass.  
Sterling Cycle Works, Chicago, Ill.

Stokes Mfg. Co., Chicago, Ill.  
Toledo Metal Wheel Co., Toledo, O.  
Western Wheel Works, Chicago, Ill.

**Bicycle Pumps.**  
Heath, S. F. Cycle Co., Minneapolis, Minn.

**Bits and Braces.**  
Fray, Jno. S. & Co., Bridgeport, Conn.  
Mason & Parker, Winchendon, Mass.

**Blocks, Tackle, Makers of.**  
Cleveland Block Co., Cleveland, O.  
Fulton Iron & Engine Works, Detroit, Mich.

**Blowers.**  
Buffalo Forge Co., Buffalo, N. Y.  
Champion Blower & Forge Co., Lancaster, Pa.  
Huyett & Smith Mfg. Co., Detroit, Mich.  
Hurtevant, B. F. & Co., Boston, Mass.

**Boiler Plates.**  
Carbo Steel Co., Pittsburgh, Pa.  
McIlvain, Wm. & Sons, Reading, Pa.  
Lukens Iron & Steel Co., Coatsville, O.  
Pottstown Iron Co., Pottstown, Pa.

**Boilers, Copper.**  
Randolph & Clowes, Waterbury, Conn.

**Boilers, Steam.**  
Babcock & Wilcox Co., 30 Cortlandt, Chandler & Taylor Co., Indianapolis, Ind.  
Edge Moor Iron Co., Wilmington.

**Boilers, Steam.**  
Fulton Steam Boiler Works and Fdry., Richmond, Ind.  
Harrison Safety Boiler Wks., Phila., Pa.  
Phoenix Iron Works Co., Meadville, Pa.  
Pollock, W. B. & Co., Youngstown, O.  
Southward Fdy. & Mch. Co., Phila., Pa.  
Sterling Co., Chicago, Ill.  
Wetherill, Robt. & Co., Chester, Pa.

**Bolt Cutters.**  
Cochran Bros. Co., Philadelphia.  
Howard Iron Works, Buffalo, N. Y.  
Porter, H. K., Boston, Mass.  
Reece, Edw. F., Greenfield, Mass.  
Wells Bros. Co., Greenfield, Mass.  
Wiley & Russell Mfg. Co., Greenfield, Mass.

**Books.**  
Williams, David, 96-102 Reade N. Y.  
Wolcott & West, Syracuse, N. Y.

**Boring Machines.**  
Buckeye Mfg. Co., Union City, Ind.

**Boxes, Hdw. Shell, &c.**  
Green, A. H., 22 Park Place, N. Y.  
Jones, Jesse & Co., Philadelphia, Pa.

**Box Straps and Corners.**  
Cary Mfg. Co., 5 to 9 Elm St., N. Y.

**Brackets.**  
Atlas Mfg. Co., New Haven, Conn.

**Brass, Manufacturers of.**  
Ansonia Brass & Copper Co., N. Y.  
Dorol, John & Sons, 100 John, N. Y.  
Plume & Atwood Mfg. Co., N. Y.  
Randolph & Clowes, Waterbury, Conn.  
Rome Brass & Copper Co., Rome, N. Y.  
Seovill Mfg. Co., Waterbury, Conn.  
Waterbury Brass Co., 298 B'way, N. Y.

**Brass Butt Hinges.**  
Tiebout, W. & J., 16 & 18 Chambers, N. Y.

**Brass Foundries.**  
Best, Fox & Co., Pittsburgh, Pa.  
Bridgeport Deoxidized Bronze & Metal Co., Bridgeport, Conn.  
Camp, Wm. & Sons, S. & E. B. Co., Philadelphia, Pa.  
Eynon-Evans Mfg. Co., Philadelphia, Pa.  
Fram, E. T., Lancaster, Pa.  
Haight & Clark, Albany, N. Y.  
Keys, W. W. & R. M. Co., Bridgeport, Conn.  
North Bros. Mfg. Co., Phila., Pa.  
Reeves, Paul S., Philadelphia.

**Brass Goods Mfg. Co., 88 Chambers, N. Y.**

**Bread and Cake Knives.**  
Christy Knife Co., Fremont, O.  
Clausen Shear Co., Fremont, O.

**Bridge Builders.**  
Berlin Iron Bridge Co., East Berlin, Ct.

**Bronze (Tobin).**  
Ansonia Brass & Copper Co., 19-26 Cliff Street, N. Y.

**Brooms and Brushes.**  
Cincinnati Mfg. Co., Cincinnati, O.  
Lay, Jos. & Co., Ridgeville, Ind.

**Builders' Hardware.**  
Corbin, P. & F., New Britain, Conn.  
Deltz, A. E., 97 Chambers St., N. Y.  
Reading Hdw. Co., Reading, Pa.  
Russell & Erwin Mfg. Co., New York  
Yale & Towne Mfg. Co., Stamford, Ct.

**Butchers' Steels.**  
Chattillon, John & Sons, 85-89 Cliff St., N. Y.  
Hoffman, C. & A., Philadelphia, Pa.  
Nichols Bros., Greenfield, Mass.

**Butcher and Shoe Knives, Manufacturers of.**  
Chattillon, John & Sons, 85-89 Cliff St., N. Y.  
Goodell Co., Antrim, N. H.  
Nichols Bros., Greenfield, Mass.  
Wilson, John, Sheffield, England.

**Butts and Hinges.**  
Clark Mfg. Co., Buffalo, N. Y.  
McKinney Mfg. Co., Allegheny, Pa.  
Sabin Machine Co., Montpelier, Vt.  
Stanley Works, New Britain, Conn.  
Tiebout, W. & J., 16 Chambers, N. Y.

**Calf Weaners.**  
Carroll Muzzle Co., Carroll, Ia.

**Cutters and Dividers.**  
J. Stevens Arms and Tool Co., Chicopee Falls, Mass.  
Starrett, L. S., Athol, Mass.

**Car Axles.**  
Roberts, A. & P. & Co., Phila.

**Carboy Stands.**  
Hillebrand & Wolf, Philadelphia, Pa.

**Carriage Hardware, Makers of.**  
Cover's Saddlery Works, Farmer, N. Y.  
Eccles, Richard, Auburn, N. Y.  
McKinnon, Dash & Hdw. Co., Ltd., Buffalo, N. Y.  
Scranton Forging Co., Scranton, Pa.  
Smith, H. D. & Co., Plantsville, Conn.  
Wilcox & Howe Co., Birmingham, Conn.

**Carriage Reloading Tools.**  
Ideal Mfg. Co., New Haven, Conn.

**Casters, Wheel, &c.**  
Clark, G. F., Windsor Locks, Conn.

**Castings, Iron and Steel.**  
Booth, The Lloyd, Co., Youngstown, O.  
The Burr & Houston Co., Brooklyn, N. Y.  
Eccles, Richard, Auburn, N. Y.  
Chester Steel Casting Co., Phila.  
Chrome Steel Works, Brooklyn, N. Y.  
Eureka Cast Steel Co., Chester, Pa.  
Flagg, Stanley G. & Co., Phila.  
Garland Foundry Co., Cleveland, O.  
Haight & Clark, Albany, N. Y.  
Kling & Andrews Co., Chicago, Ill.  
Pamers & De Moor, Cleveland, O.  
Pownall, F. H., Jamesburg, N. J.  
Pratt & Cady Co., Hartford, Conn.  
Sessions Foundry Co., Bristol, Conn.  
Spencer's I. S., Sons, Guilford, Conn.  
Standard Fdy. & Mfg. Co., Cleveland, O.  
Standard Steel Casting Co., Thurlow, Pa.  
Taylor & Boggis Fdry. Co., Cleveland, Ohio.  
Totten & Hogg Iron & Steel Fdry Co., Pittsburgh, Pa.  
Union Lock & Hdw. Co., Ltd., Lancaster, Pa.  
Western Fdy. Co., Chicago, Ill.  
Wetherill, Robt. & Co., Chester, Pa.

**Castings, Malleable.**  
Acade Malleable Iron Co., Worcester, Mass.  
Burgess & Loxley, Buffalo, N. Y.  
Dayton Malleable Iron Co., Dayton, O.  
Hammer & Co., Branford, Conn.  
Woodruff, W. W. & Sons, Mt. Carmel, Conn.

**Chains.**  
Bradlee & Co., Philadelphia.  
Kelley & McBean, Niagara Falls, N. Y.  
Link-Belt Engineering Co., Phila., Pa.  
McKay, Jas. & Co., Pittsburg, Pa.

**Chimneys.**  
Phila. Engineering Works, Phila., Pa.

**Chisels, Manufacturers of.**  
Buck Bros., Millbury, Mass.  
White, L. & I. J. Co., Buffalo, N. Y.

**Chucks.**  
Chushman Chuck Co., Hartford, Conn.  
Houston, C. B. & Co., New Haven, Conn.  
Smith & Egge Mfg. Co., Bridgeport.  
Union Mfg. Co., 103 Chambers, N. Y.  
Whitton, D. E. Mach. Co., New London, Conn.

**Clamps.**  
Hammer & Co., Branford, Conn.  
Le Count, C. W., So. Norwalk, Conn.

**Clippers.**  
Lee, Jesse & Sons, Philadelphia, Pa.

**Clipping Machines.**  
McCoy, Jos. F. & Co., 26 Warren St. N. Y.

**Coal.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Wister, Francis, Philadelphia, Pa.

**Coffee and Spice Mills.**  
Sun Mfg. Co., Greenfield, O.

**Coke.**  
Barns, C. K. & Co., Philadelphia, Pa.  
Houston, C. B. & Co., Philadelphia, Pa.  
Rainey, W. J., Cleveland, O.  
Wister, Francis, Philadelphia, Pa.

**Collections.**  
Hardware Board of Trade (Limited) 4 and 6 Warren, N. Y.

**Condensers.**  
Worthington, Henry R., 86 & 88 Liberty Street, N. Y.

**Conveying Machinery.**  
Brown Hoisting & Conveying Machine Co., Cleveland, Ohio.  
Jeffrey Mfg. Co., Columbus, O.  
Link Belt Engineering Co., Phila., Pa.

**Copper.**  
Ames Sword Co., Chicopee, Mass.  
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.  
Hendricks Bros., 49 Cliff, N. Y.  
New Haven Copper Co., 294 Pearl, N. Y.  
Randolph & Clowes, Waterbury, Conn.  
Rome Brass & Copper Co., Rome, N. Y.  
Wister, Francis, Philadelphia, Pa.

**Cordage.**  
Samson Cordage Works, Boston, Mass.

**Cork Screws.**  
Williamson, C. T. Wire Novelty Co. Newark, N. J.

**Cornice Brakes.**  
Bertsch & Co., Cambridge City, Ind.

**Corn Poppers.**  
Olsen, A. B., Kansas City, Mo.

**Corn Shellers.**  
Garry Iron Rfg. Co., Cleveland, O.

**Corrugated Furnaces.**  
Continental Iron Wks, Brooklyn, N. Y.

**Corrugated Iron.**  
Cincinnati Corrugating Co., Piqua, O.  
Cambridge Roofing Co., Cambridge, O.  
Moseley Iron Bridge & Roof Co., 5 Day N. Y.  
N. Y. Iron Roofing & Corrugating Co., Jersey City, N. J.

**Counting Machines.**  
Durant, W. N., Milwaukee, Wis.

**Coverings, Boiler and Pipe.**  
Johns, H. W. Mfg. Co., 87 Maiden Lane

**Cranes.**  
Detroit Foundry Equipment Co., Detroit, Mich.  
Halsey, W. S. & Co., Birdsboro, Pa.  
Harrington, E. Son & Co., Phila., Pa.  
Maris & Beekley Philadelphia, Pa.  
Ridgway, Craig & Sons, Coatesville, Pa.  
Sellers, Wm. & Co., Inc., Phila., Pa.  
Yale & Towne Mfg. Co., Stamford, Conn.

**Credits.**  
Baly, Jno. W. Co., 275-280 B'way, N. Y.

**Cupolas, Hot-Blast.**  
Byram & Co., Detroit, Mich.  
Colliau, Victor, Detroit, Mich.  
Detroit Fdry. Equipment Co., Detroit, Mich.

**Curry Combs.**  
Decker Mfg. Co., Keokuk, Iowa.  
Gibbs Mfg. Co., Canton, O.

**Curly Cases.**  
Torrey, J. R. & Co., Worcester, Mass.

**Cutlery Enamel.**  
Shipley, A. B. & Son, Phila., Pa.

**Cutlery, Importers of.**  
Field, Alfred C., 93 Chambers St., New York.  
Gurney, Fred B., 116 Chambers St., N. Y.  
Sickles, Sweet & Lyon, 35 Barclay, N. Y.

**Cutlery, Manufacturers of.**  
Bingham, W. Co., Cleveland, Ohio.  
Christy Knife Co., Fremont, O.  
Clausen Shear Co., Fremont, O.  
Dane, Stoddard & Kendall, Boston, Mass.  
Electric Cutlery Co., 113 Chambers, N. Y.  
Goodell Co., Antrim, N. H.  
Nichols Bros., Greenfield, Mass.  
Northampton Cutlery Co., Northampton, Mass.  
Wilson, John, Sheffield, England.

**Delhorner.**  
Brown, H. H. Mfg. Co., Decatur, Ill.

**Cyclometers.**  
Bridgeport Gun Implement Co., 313 315 Broadway, N. Y.

**Dies.**  
Wilson, J. Fred, Worcester, Mass.

**Die Forgings and Castings.**  
Bliss, E. W. Co., Brooklyn, N. Y.

**Dog Collars.**  
Kelley & McBean, Niagara Falls, N. Y.  
Union Hardware Co., Torrington, Ct.

**Door Checks and Springs.**  
Hardsley, J., 149 & 151 Baxter St., N. Y.  
Corbin, P. & F., New Britain, Conn.

**Door Knobs.**  
Perry & Whipple Co., New Haven, Ct.

**Drain Cleaners.**  
Buckeye Mfg. Co., Union City, Ind.

**Drilling Machines.**  
Buffalo Drill & Tool Co., Cin., Ohio.  
Buckford Forge Co., Buffalo, N. Y.  
Champion Blower and Forge Co., Lancaster, Pa.  
Colburn, A. M., New Haven, Conn.  
Dallett, Thos. H. & Co., Philadelphia.  
Dwight Slate Machine Co., Hartford, Conn.

**Drills.**  
Halsey, Jas. T., Philadelphia, Pa.  
Hamilton Mch. Tool Co., Hamilton, O.  
Herrick & Cowell, New Haven, Conn.  
Norton & Jones Machine Tool Works, Plainville, Conn.  
Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.  
Quint, A. D., Hartford, Conn.  
Sellers, Wm. & Co., Inc., Phila., Pa.  
Sigourney Tool Co., Hartford, Conn.  
Silver Mfg. Co., Salem, O.  
Woodward & Rogers, Hartford, Conn.

**Drop Forgings.**  
Billings & Spencer Co., Hartford, Conn.  
Boone, W. C. Mfg. Co., Boonton, N. J.  
Eccles, Richard, Auburn, N. Y.  
Merrill Bros., Brooklyn, N. Y.  
Miner & Peck Mfg. Co., New Haven, Ct.  
Phila. Drop Forge Co., Philadelphia, Pa.  
Scranton Forging Co., Scranton, Pa.  
Spies, J. C. & Co., Worcester, Mass.  
Williams, J. H. & Co., Brooklyn, N. Y.  
Wilmet & Hobbs Mfg. Co., Bridgeport, Conn.

**Wymann & Gordon, Worcester, Mass.**

**Drop Presses.**  
Bliss, E. W. Co., Brooklyn, N. Y.  
Crosby, G. A. & Co., Chicago, Ill.  
Ferracuta Mch. Co., Bridgeton, N. J.  
Gainer & Peck Mfg. Co., New Haven, Conn.  
Stiles & Parker Press Co., Brooklyn, N. Y.



- Volcan Iron Works, Chicago, Ill.**  
**Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.**
- Dumb Walters.**  
 Storm Mfg. Co., Newark, N. J.
- Dust Beaters.**  
 Peabody & Parks, Troy, N. Y.
- Dynamite.**  
 New York Powder Co., 62 Liberty St. N. Y.
- Dynamos.**  
 O. & C. Electric Co., 402 and 404 Greenwich St., N. Y.  
 Zucker & Levett Chemical Co., 10 1/2 Grand St., N. Y.
- Edge Tools. Makers of.**  
 Amer. Axe & Tool Co., 280 B'way, N.Y.  
 Buck Bros., Millbury, Mass.  
 Mann Edge Tool Co., Lewiston, Pa.  
 Plumb, Fayette R., Philadelphia, Pa.  
 Standard Axe & Tool Co., Ridgway, Pa.  
 White, L. & J. C. Co., Buffalo, N. Y.
- Edging Shears.**  
 Dille & McGuire Mfg. Co., Richmond, Ind.
- Egg Beaters.**  
 North Bros. Mfg. Co., Philadelphia.
- Electric Bells and Supplies.**  
 Ostrander, W. R. & Co., 204 Fulton St., New York  
 Wollensak, J. F., Chicago, Ill.
- Electric Dynamo Machines.**  
 Eddy Electric Mfg. Co., Windsor, Conn.  
 Hanson & Van Winkle Co., Newark, N.J.
- Elevators. Makers of.**  
 Link-Belt Engineering Co., Phila., Pa.  
 Morse, Williams & Co., Phila., Pa.
- Emery and Emery Wheels.**  
 N. Y. Belting & Packing Co., Ltd., N. Y.  
 Northampton Emery Wheel Co., Leeds, Mass.  
 Norton Emery Wheel Co., Worcester, Mass.  
 Sturtevant Mill Co., Boston, Mass.
- Emery Wheel Dressers.**  
 Bay State Stamping Co., Worcester, Mass.
- Enamels.**  
 Nubian Iron Enamel Co., Cragin, Ill.
- Engineers and Contractors.**  
 Alken Henry, Pittsburgh, Pa.  
 Artificial Gas Engineering Co., Pittsburgh, Pa.  
 Herrick, J. A., 284 Pearl St., N. Y.  
 Kennedy, Julian, Pittsburgh, Pa.  
 Laughlin, Alex. & Co., Pittsburgh, Pa.  
 Lean, D. R. Co., Pittsburgh, Pa.  
 McClure, Amster & Co., Pittsburgh, Pa.  
 Co., Pittsburgh, Pa.  
 Smythe, S. H. Co., Incorporated Pittsburgh, Pa.  
 Swindell, W. & Bros., Pittsburgh, Pa.
- Engines. Gas.**  
 Otto Gas Engine Works, Phila., Pa.  
 Rollason Gas Engine, Havemayer Bldg., N. Y.
- Engines. Steam. Makers of.**  
 Bass Foundry & Machine Works, Ft. Wayne, Ind.  
 Buckeye Engine Co., Salem, O.  
 Chandler & Taylor Co., Indianapolis, Ind.  
 Erie Engine Works, Erie, Pa.  
 Lane & Bodley Co., Cincinnati, O.  
 Norwalk Iron Works Co., So. Norwalk, Conn.  
 Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.  
 Phila. Engineering Works, Phila., Pa.  
 Phoenix Iron Wks. Co., Meadville, Pa.  
 Southwick Foundry and Machine Co., Phila., Pa.  
 Tod, William & Co., Youngstown, O.  
 Wetherill, Robt. & Co., Chester, Pa.
- Exhaust Tumblers.**  
 Sweeter, W. A., Brockton, Mass.
- Expansion Belts.**  
 Boone, W. C. Mfg. Co., Boonton, N. J.  
 Church, Isaac, Toledo, O.  
 Steward & Romaine Mfg. Co., Phila., Pa.
- Faucets. Self-Measuring.**  
 Lane Bros., Poughkeepsie, N. Y.
- Faucets. Wooden. Makers of.**  
 John Sommer's Son, Newark, N. J.
- Feed-Water Heaters.**  
 Davis, I. B. & Son, Hartford, Conn.  
 Goubert Mfg. Co., 32 Cortlandt St., N. Y.  
 Harrison Safety Boiler Wks., Phila., Pa.  
 National Pipe Bending Co., New Haven, Conn.  
 Taunton Locomotive Mfg. Co., Taunton, Mass.  
 Webster, Warren & Co., Camden, N. J.  
 Whitlock Coil Pipe Co., Elmwood, Conn.
- Fence Ratchet.**  
 Schriver, C. & Co., Cincinnati, O.  
 Stauffer, J., Dayton, Ohio.
- Fencing. Iron and Wire.**  
 Sarnum, E. T., Detroit, Mich.  
 Champion Iron Co., Kenton, O.  
 Clinton Wire Cloth Co., Clinton, Mass.  
 Gilbert & Bennett Mfg. Co., 42 Cliff St., Filmer Mfg. Co., Newburgh, N. Y.  
 McCallip Fence & Wire Works, Columbus, O.  
 Mast, Foss & Co., Springfield, O.  
 The Van Dorn Iron Works Co., Cleveland, O.
- Fiber Ware.**  
 Standard Fiber Ware Co., Mankato, Minn.
- File Cards.**  
 Frasse Co., 19 Warren St., N. Y.
- Files. Importers of.**  
 Moss, F. W., 80 John, N. Y.
- Files and Rasps. Manufacturers of.**  
 Arcade File Works, Anderson, Ind.  
 Tanker & White, Troy, N. Y.  
 Barnett, G. & H., 41 & 43 Richmond Phila.  
 McCaffrey File Co., Philadelphia.  
 Nicholson File Co., Providence R. I.
- Fire Brick. Makers of.**  
 Morgner, Cyrus, Philadelphia, Pa.  
 Gardner, Jas. & Son, Cumberland, Md.  
 Kreischer B. & Sons, foot E. Houston, St.  
 McLeod & Henry Co., Troy, N. Y.  
 Maurer, H. & Son, 420 E. 23d, N. Y.  
 Ostrander Fire Brick Co., Troy, N. Y.  
 Solomon, J. M., Wilmington, Del.  
 Valentine, M. L. & Bro., Woodbridge.
- Fishing Tackle.**  
 Dame, Stoddard & Kendall, Boston, Mass.
- Flint.**  
 Crystal Mills Co., Chester, Mass.
- Flint and Emery Paper.**  
 Baeder, Adamson & Co., Phila., Pa.
- Flour Sifters.**  
 Meyers, F. J. Mfg. Co., Hamilton, O.
- Flue Cleaners.**  
 Mackey, Jas. T., St. Louis, Mo.
- Fodder Cutters.**  
 Silver Mfg. Co., Salem, O.
- Forges. Portable. &c.**  
 Bullock Bellows Co., Cleveland, O.  
 Buffalo Forge Co., Buffalo, N. Y.  
 Champion Blower & Forge Co., Lancaster, Pa.  
 Foss Mfg. Co., Springfield, Ohio.  
 Sturtevant, B. F. Co., Boston, Mass.
- Forgings. Iron and Steel.**  
 Bethlehem Iron Co., S. Bethlehem, Pa.  
 Cambria Steel—Cambria Iron Co., Johnstown, Pa.  
 Frankford Steel Co., Phila., Pa.  
 Scranton Forging Co., Scranton, Pa.  
 U. S. Projectile Co., Brooklyn, N. Y.
- Foundry Facing.**  
 Dixon, Jos., Crucible Co., Jersey City, N. J.
- Foundry Supplies.**  
 Collard, Victor, Detroit, Mich.  
 Diamond Clamp & Flask Co., Richmond, Ind.  
 S. Obermayer Co., Cincinnati, O.  
 Smith, J. D. Fdy. Supply Co., Cin., O.  
 Solomon, Jno. M., Wilmington, Del.
- Foundry Middles.**  
 Estey, W. S., 65 Fulton, N. Y.
- Foundry Supplies.**  
 Collard, Victor, Detroit, Mich.  
 Diamond Clamp & Flask Co., Richmond, Ind.  
 S. Obermayer Co., Cincinnati, O.  
 Smith, J. D. Fdy. Supply Co., Cin., O.
- Friction Clutches.**  
 Keystone Clutch & Mch. Wks., Phila., Pa.  
 Moore & White Co., Philadelphia, Pa.
- Friction Cone.**  
 Evans Friction Cone Co., Boston, Mass.
- Furnaces. Foundry.**  
 Byram & Co., Detroit, Mich.
- Garden Tools.**  
 Dunlap, C. W., Box 2703, New York
- Gas Producers.**  
 Wood, R. D. & Co., Philadelphia, Pa.
- Gas and Steam Fitters' Supplies.**  
 Pancoast, Henry B. & Co., Phila., Pa.
- Gauge. Rolling Mill.**  
 Haines Gauge Co., Philadelphia, Pa.
- Gear Cutters.**  
 D. E. Whiton Mach. Co., New London, Conn.
- Gears.**  
 Boston Gear Works Boston, Mass.  
 Poole, Robt. & Son Co., Baltimore, Md.  
 U. S. Projectile Co., Brooklyn, N. Y.
- Glass Boards.**  
 Canton Saw Co., Canton, O.
- Glass Cutters.**  
 Monce, S. G., Bristol, Conn.
- Glue.**  
 Baeder, Adamson & Co., Phila., Pa.  
 Dodd, A. W. & Co., Gloucester, Mass.  
 Russia Cement Co., Gloucester, Mass.
- Grass Catchers.**  
 Supplee Hardware Co., Phila., Pa.
- Grinding and Polishing Machines.**  
 Herriek & Cowell, New Haven, Conn.  
 Norton Emery Wheel Co., Worcester, Mass.
- Grinding Mills.**  
 Foss Mfg. Co., Springfield, O.
- Grindstone Dressing Machinery.**  
 Blake & Johnson, Waterbury, Conn.
- Grindstones.**  
 Cleveland Stone Co., Cleveland, O.
- Gun Implements.**  
 Union Hdw. Co., Torrington, Conn.
- Gunpowder. Makers of.**  
 Ladin & Rand Powder Co., 29 Murray St., N. Y.
- Hand Cards.**  
 Lansing Wheelbarrow Co., Lansing, Mich.
- Handles.**  
 New York Mallet and Handle Wks., 456 E. Houston St., N. Y.
- Hangers. Door.**  
 Chicago Spring Butt Co., Chicago, Ill.  
 Coburn Trolley Track Mfg. Co., Holyoke, Mass.
- Lane Bros., Poughkeepsie, N. Y.**  
 Victor Mfg. Co., Newburyport, Mass.
- Hardware Comm'n Merchants.**  
 Doehner, Martin, 88 Chambers, N. Y.  
 Field, Alfred & Co., 93 Chambers St., N. Y.  
 Graham, John H. & Co., 111 Chambers St., New York  
 Jacobus, W. H., 90 Chambers, N. Y.
- Hardware Manufacturers.**  
 Dunlap, C. W., Box 2703, New York.  
 Russell & Erwin Mfg. Co., Chambers St., New York.  
 Stearns, E. C. & Co., Syracuse, N. Y.  
 Union Mfg. Co., 108 Chambers, N. Y.  
 Yale & Towne Mfg. Co., Stamford, Conn.
- Hardware Mfrs. Agents.**  
 Bingham, W. Co., Cleveland, O.  
 Clarke, Thomas, St. John, N. B.  
 Grant & Jones, 100 E. 118 Chambers.  
 McCoy, Jos. F. Co., 28 Warren St., N. Y.  
 Sickies, Sweet & Lyon, 35 Barclay, N. Y.
- Hardware Specialties.**  
 Acme Shear Co., Bridgeport, Conn.  
 Berger Bros., Philadelphia, Pa.  
 Clark Mfg. Co., Buffalo, N. Y.  
 Enterprise Mfg. Co., Philadelphia, Pa.  
 Ette & Henger Mfg. Co., St. Louis, Mo.  
 Gwinner Mfg. Co., Hamilton, O.  
 Haines & Zimmerman, Phila., Pa.  
 Johnson, S. C., Racine, Wis.  
 Knapp & Cowles Mfg. Co., Bridgeport, Conn.  
 North Bros. Mfg. Co., Philadelphia, Pa.  
 Peabody & Parks, Troy, N. Y.  
 Scranton & Co., New Haven, Conn.  
 Wilson, J. Fred, Worcester, Mass.
- Harness Hooks.**  
 Washburn, B. D., Boston, Mass.
- Harness Snaps.**  
 Covert Mfg. Co., West Troy, N. Y.  
 Coverts' Saddlery Wks., Farmer, N. Y.  
 Fitch, W. & E. T., New Haven, Conn.
- Holisting Machines.**  
 Box, Alfred & Co., 314 Green, Phila.  
 Brown Holisting & Conveying Mch. Co., Cleveland, O.  
 Fulton Iron & Engine Wks., Detroit, Mich.  
 Harrington, E., Son & Co., Phila.  
 Lane Bros., Poughkeepsie, N. Y.  
 Lidgerwood Mfg. Co., 96 Liberty, N. Y.  
 Marks & Beckley, Philadelphia.  
 Moore Mfg. & Dry Co., Milwaukee, Wis.  
 Morse, Williams & Co., Phila.  
 Sellers, Wm. & Co., Phila. and N. Y.  
 Speldel, J. G., Reading, Pa.  
 Yale & Towne Mfg. Co., Stamford, Ct.
- Hollow Ware.**  
 Bronson Supply Co., Cleveland, Ohio.  
 Cleveland Stamping & Tool Co., Cleveland, O.  
 Stuart & Peterson Co., Phila., Pa.
- Hollow Ware, Aluminum.**  
 Illinois Pure Aluminum Co., Lemont, Ill.
- Horse Nails. Makers of.**  
 Capewell Horse Nail Co., Hartford, Conn.  
 National Horse Nail Co., Vergennes, Vt.  
 Putnam Nail Co., Neponset, Boston, Mass.
- Horse and Mule Shoes. Makers of.**  
 Bryden Horse Shoe Co., Catsauqua, Pa.  
 Current Iron Co., Troy, N. Y.  
 Crescent Horse Shoe & Iron Co., Max Meadows, Va.  
 Diamond State Iron Co., Wilmington, Del.  
 Old Dominion Iron & Nail Works Co., Richmond, Va.  
 Phoenix Horse Shoe Co., Poughkeepsie, N. Y.  
 Rhode Island Perkins Horse Shoe Co., Providence.  
 Shoemaker & Co., Pittsburgh, Pa.  
 Standard Horse Shoe Co., Boston, Mass.
- Hose.**  
 Cleveland Rubber Works, Cleveland, O.  
 N. Y. Belting & Packing Co., Ltd., 16 Park Row, N. Y.
- Hose Clamps.**  
 Clancy, J. R., Syracuse, N. Y.
- Hydrants, &c.**  
 McLean, John, 296 & 298 Monroe, N. Y.
- Hydraulic Forging.**  
 U. S. Projectile Co., Brooklyn, N. Y.
- Hydraulic Jacks.**  
 Dudgeon, Richard, 24 Columbia, N. Y.  
 Watson & Stillman, 204 E. 43d, N. Y.
- Ice Breakers.**  
 Clement & Dunbar, Philadelphia, Pa.
- Ice-Cream Freezers.**  
 Clement & Dunbar, Phila., Pa.  
 North Bros. Mfg. Co., Phila., Pa.  
 Packer, C. W., Philadelphia, Pa.  
 Tatum, S. C. & Co., Cincinnati, Ohio.  
 White Mountain Freezer Co., Nashua, N. H.
- Injectors.**  
 Eynon-Evans Mfg. Co., Philadelphia, Pa.  
 Jenkins Bros., New York  
 Sherwood Mfg. Co., Buffalo, N. Y.
- Insurance. Boiler.**  
 Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.
- Iron and Steel. Swedish.**  
 Lindberg, Gustaf, Sweden, Mass.  
 Milne, A. & Co., 1 Broadway, N. Y.
- Iron Commission Brokers.**  
 Corning, Edw. & Co., 29 B'way, N. Y.  
 Cotton, Barclay W. & Co., Phila.  
 Etting, Edw. J., Philadelphia.  
 Hogan, John L. & Co., Philadelphia, Pa.
- Hoffman, J. W. & Co., Philadelphia.**  
 Levis, Henry & Co., Philadelphia.  
 Keeley, Jerome & Co., Philadelphia.  
 Lea, J. Tatnall & Co., Philadelphia.  
 Mohr, J. J., 480 Walnut, Philadelphia.  
 Pilling & Crane, Philadelphia, Pa.  
 Wister, L. & R. & Co., Phila., Pa.
- Iron Ore.**  
 Naylor & Co., 45 Wall, N. Y.  
 Samuel, Frank, Philadelphia, Pa.
- Iron. Merchants.**  
 Barnes, C. K. & Co., Philadelphia, Pa.  
 Borden & Lovell, 70 West, N. Y.  
 Bussanitus & Caniffie, Philadelphia.  
 Corning Edw. & Co., 29 B'way, N. Y.  
 Cox, Justice, Jr., Philadelphia.  
 Cotton, Barclay W. & Co., Phila.  
 Hoffman, J. W. & Co., Philadelphia.  
 Leonard, J., 446 West St., N. Y.  
 Naylor & Co., 45 Wall St., N. Y.  
 Nickel & Huber & Co., Philadelphia.  
 Ogden & Wallace, 85 Elm St., N. Y.  
 Pierson & Co., 29 Broadway, N. Y.  
 Thomson, W. H. & Co., Phila., Pa.  
 Wallace, Wm. H. & Co., Albany & Washington streets, N. Y.  
 Whitney, A. R. & Co., 17 B'way, N. Y.  
 Wilson, E. H. & Co., Philadelphia.
- Iron. Importers.**  
 Abbott Wheelock & Co., N. Y. and Boston  
 Lundberg, Gustaf, Boston, Mass.
- Iron. Sheet. Manufacturers of.**  
 Cambridge Iron & Steel Co., Cambridge, Ohio  
 W. Dewees Wood Co., Lim., McKeesport, Pa.
- Iron Vases.**  
 Walbridge & Co., Buffalo, N. Y.
- Ironwork. Ornamental.**  
 Barnum, E. T., Detroit, Mich.  
 Champion Iron Co., Kenton, O.  
 Lange Fence & Wire Co., St. Louis, Mo.  
 Ludlow-Saylor Wire Co., St. Louis, Mo.  
 Mast, Foss & Co., Springfield, O.  
 The Van Dorn Iron Works Co., Cleveland, O.
- Little Bottom.**  
 Diamond Hdw. Co., Boston, Mass.
- Keys.**  
 Wollensak, J. F., Chicago, Ill.
- Ladders, Rolling.**  
 Coburn Trolley Track Mfg. Co., Holyoke, Mass.
- Ladies.**  
 Detroit Fdy. Equipment Co., Detroit, Mich.
- Lamps.**  
 Plume & Atwood Mfg. Co., New York.  
 Standard Lighting Co., Cleveland, O.
- Lamp Stoves.**  
 Glazier Stove Co., Chelsea, Mich.  
 Plume & Atwood Mfg. Co., 18 Murray Street, New York.
- Lanterns.**  
 Steam Gauge & Lantern Co., Syracuse, N. Y.
- Lathes.**  
 Draper Machine Tool Co., Worcester, Mass.  
 Johnson, Israel H., Jr., & Co., Philadelphia, Pa.  
 Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Lathing Wire.**  
 Clinton Wire Cloth Co., Clinton, Mass.  
 N. J. Wire Cloth Co., Trenton, N. J.  
 Wright & Colton Wire Cloth Co., Worcester, Mass.
- Laundry Machines.**  
 Johnson, S. C., Racine, Wis.
- Lawn Mowers.**  
 Blair Mfg. Co., Springfield, Mass.  
 Chadborn & Coldwell Mfg. Co., Newburgh, N. Y.  
 Champion Mfg. Co., Richmond, Ind.  
 Coldwell Lawn Mower Co., Newburgh, N. Y.  
 Dille & Anderson, Richmond, Ind.  
 Dille & McGuire Mfg. Co., Richmond, Ind.  
 Enterprise Mfg. Co., Philadelphia, Pa.  
 F. & N. Mfg. Co., Richmond, Ind.  
 Henley, H. C., Richmond, Ind.  
 Mast, Foss & Co., Springfield, O.  
 Philadelphia Lawn Mower Co., Philadelphia, Pa.  
 Stearns, S. C. & Co., Syracuse, N. Y.  
 Supplee Hdw. Co., Phila., Pa.
- Lawn Rakes.**  
 Gibbs Mfg. Co., Canton, Ohio.  
 Knier, F. E. & Co., Canton, O.
- Lawn Sprinklers.**  
 Ette & Henger Mfg. Co., St. Louis.  
 Gibbs Mfg. Co., Canton, Ohio.  
 McGowan, John H. Co., Cincinnati O.  
 Portland Lawn Sprinkler Co., Portland, Me.
- Lemon Squeezers.**  
 Ripley Mfg. Co., Unionville, Conn.
- Letters and Figures. Metallic.**  
 White, A. A. & Co., Providence, R. I.
- Letters. Paper.**  
 Tablet & Ticket Co., Chicago, Ill.
- Levels.**  
 Davis & Cook, Watertown, N. Y.  
 Richardson, C. F., & Son Athol, Mass.
- Locks & Knobs. Manufacturers of.**  
 Deltz, A. E., 97 Chambers, N. Y.  
 Reading Hdw. Co., Reading, Pa.  
 Romer & Co., Newark, N. J.  
 Smith & Egge Mfg. Co., Bridgeport, Conn.  
 Yale & Towne Mfg. Co., Stamford, Conn.
- Lubricants.**  
 Dixon, Jos., Crucible Co. Jersey City N. J.



**Machinery.**

Am. Tool Works, Cleveland, Ohio.  
 Barnes, W. F. & John, Rockford, Ill.  
 Bement, Miles & Co., Philadelphia, Pa.  
 Bigelow, C. E., 45 Dey, N. Y.  
 Bignall & Keeler Mfg. Co., St. Louis.  
 Birmingham Iron Foundry, Birmingham, Conn.  
 Bliss, E. W. Co., Brooklyn, N. Y.  
 Bogert, Jno. L., Flushing, N. Y.  
 Bridgeport Mch. Tool Works, Bridgeport, Conn.  
 Briggs, Marvin, 12 Broadway, N. Y.  
 Carlin's Sons, Thos., Allegheny, Pa.  
 Chinn, Milling Mch. Co., Cincinnati, Ohio.  
 Clapp, Geo. M., agt., 74 Cortlandt, N. Y.  
 Detroit & Harvey Mch. Co., Baltimore, Md.  
 Fitchburg Mch. Works, Fitchburg, Mass.  
 Garvin Mch. Co., Laight & Canal Sts.  
 Gould & Eberhardt, Newark, N. J.  
 Hamilton Mch. Tool Co., Hamilton, O.  
 Harrington, E. Son & Co., Phila., Pa.  
 Henderer, A. L., Wilmington, Del.  
 Hender Machine Co., Torrington, Ct.  
 Hill, Clarke & Co., Boston, Mass.  
 Howard & Morse, 45 Fulton St., N. Y.  
 Hubert-Rogers Mch. Co., South Sudbury, Mass.  
 Johnson, Israel H., Jr., & Co., Phila.  
 Jones & Lamson Mch. Co., Springfield, Vt.  
 Lovegrove & Co., Philadelphia, Pa.  
 McCabe, J. J., 68 Cortlandt, N. Y.  
 Machinists Supply Co., Rochester, N. Y.  
 Manville, E. J. Mch. Co., Waterbury, Conn.  
 National Machinery Co., Tiffin, Ohio.  
 Newark Mch. Tool Works, Newark, N. J.  
 New Haven Mfg. Co., New Haven, Conn.  
 Niles Tool Wks., 138 Liberty St., N. Y.  
 Pittsburgh Mfg. Co., Pittsburgh, Pa.  
 Place, Geo., 120 Broadway, N. Y.  
 Poole, Robt. & Son Co., Baltimore, Md.  
 Powell Planer Co., Worcester, Mass.  
 Pratt & Whitney Co., Hartford, Conn.  
 Fretless Tool & Supply Co., N. Y.  
 Scranton Supply & Mchry. Co., Scranton, Pa.  
 Sellers, Wm. & Co., Phila.  
 Seyfert's Sons L. F., Philadelphia, Pa.  
 Steptoe, J. & Co., Cincinnati, O.  
 Stow Flexible Shaft Co., Ltd., Phila.  
 Toomey, Frank, Philadelphia, Pa.  
 Wetherill, Robert & Co., Cnester, Pa.  
 Wickes Bros., Saginaw, Mich.  
 Wilson, W. A., Rochester, N. Y.

**Machinery for Hardware Manufacture.**

Adt, Jno. & Son, New Haven, Conn.  
 Lorin Coes & Co., Worcester, Mass.  
 Loyd, John, 568-562 Water St., N. Y.

**Machine Tools.—See machinery.****Machine Work.**

Fapping, J., 58th St., & 11th Ave., N. Y. City.

**Machinists' Scales.**

Coffin & Leighton, Syracuse, N. Y.  
 Starrett, L. S., Athol, Mass.  
 Valentine Tool Co., Hartford, Conn.

**Machinists' Tools and Supplies.**

King, J. M. & Co., Waterford, N. Y.  
 Sellers, Wm. & Co., Inc., Phila.

**Mallets.**

N. Y. Mallet & Handle Works, N. Y.

**Mangles.**

Johnson, S. C., Racine, Wis.

**Manufacturing Sites.**

Illinois Central R. R., Chicago, Ill.

**Measuring Tapes.**

Keuffel & Esser Co., New York.  
 Lufkin Rule Co., Saginaw, Mich.

**Mechanical Instruction.**

Correspondence School of Mechanics  
 Scranton, Pa.

**Metals.**

Fearing, Wm. S., 100 Chambers, N. Y.  
 Hendricks Bros., 49 Cliff, N. Y.  
 Naylor & Co., 45 Wall, N. Y.

**Metal Brokers.**

American Metal Co., N. Y.

**Metallic Ceilings.**

Penn. Iron Roofing & Corrugating Co., Phila., Pa.

**Metallurgists.**

Britton, J. Blodgett, Phil.

**Milling Machines.**

Cin. Milling Mch. Co., Cincinnati, Ohio.

**Mining Knives.**

Palmer Edw. Mfg. Co., Troy, N. Y.

**Stine Lamps.**

Darby, Edw. & Sons, Phila., Pa.  
 Leonard, B. E., Scranton, Pa.

**Mining Screens.**

Harrington & King Perforating Co., Chicago, Ill.

**Models, Makers of.**

Franklin, H. H. Mfg. Co., Syracuse, N. Y.

**Molding Sand.**

Obermayer, S. Co., Cincinnati, O.

**Money Drawers.**

Sun Mfg. Co., Greenfield, O.

**Motors, Water and Electric.**

C. & C. Electric Co., 402 and 404  
 Greenwich St., N. Y.  
 Dallett, Thos. H. & Co., Phila., Pa.

**Mail Machinery.**

Pittsburgh Mfg. Co., Pittsburgh, Pa.

**Nail Pullers.**

Scranton & Co., New Haven, Conn.

**Nails (Cut) and Spikes.**

Borden & Lovell, 70 West, N. Y.  
 Cumberland Nail & Iron Co., Phila.  
 Oxford Iron Co., 63 Washington  
 Pottstown Iron Co., Pottstown, Pa.  
 Riverside Iron Wks., Wheeling, W. Va.  
 Valley Steel Co., St. Louis, Mo.

**Nickel Platers' Supplies.**

Eddy Electric Mfg. Co., Windsor, Conn.  
 Hanson & Van Winkle Co., Newars, N. J.  
 Zucker & Levett Chemical Company,  
 10 to 14 Grand St., N. Y.

**Norway Shapes, Rollers of.**

Jowland, William & Harvey, Framford, Philadelphia

**Novelty Manufacturers.**

Franklin, H. H. Mfg., Syracuse, N. Y.

**Ideal Machine Works, Hartford, Conn.****Net Machines.**

Ounham Nut Mch. Co., Unionville, Ct.

**Nuts, Bolts, &c., Makers of.**

American Bolt Co., Lowell, Mass.

American Screw Co., Providence, R. I.

Blake & Johnson, Waterbury, Conn.

Jassell, Wm. H. Co., Pawtucket, R. I.

Mt. Carmel Bolt Co., Mt. Carmel, Conn.

Pennsylvania Bolt & Nut Co., Lebanon, Pa.

Port Chester Bolt and Nut Co., Port Chester, N. Y.

Russell, Burdall & Ward, Port Chester, N. Y.

Sternberg, J. H. & Son, Reading, Pa.

Wilson, J. Fred., Worcester, Mass.

Wm. H. Haskell Co., Pawtucket, R. I.

**All Cups and Lubricators.**

Sherwood Mfg. Co., Buffalo, N. Y.

**Oilers.**

Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.

**All Stones.**

Pike Mfg. Co., Pike Station, N. H.

**Oil Stoves.**

Glazier Stove Co., Chelsea, Mich.

**Orange Shears.**

Henry, J. T., Mfg. Co., Hamden, Conn.

**Ores.**

Wister, Francis, Philadelphia, Pa.

**Ex Shoes.**

Scranton Forging Co., Scranton, Pa.

**Packing.**

Morrison, Robt., St. Louis, Mo.

N. Y. Belting & Packing Co., Ltd., N. Y.

**Padlocks.**

Ames Sword Co., Chicopee, Mass.

Pratt, E. T., Lancaster, Pa.

Hillebrand & Wolf, Phila., Pa.

**Pails.**

Richmond Cedar Wks., Richmond, Va.

**Paint.**

Garry Iron & Steel Roofing Co., Cleveland, O.

**Paint Burners.**

Dangler Stove & Mfg. Co., Cleveland, O.

**Paint Cans.**

Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.

**Pants Stretcher.**

Covert Mfg. Co., West Troy, N. Y.

**Patent Mallets.**

Butler, C. N., Phila., Pa.

Cowson & Howson, Phila. & Washington

Jennett, H. W. T., Washington, D. C.

stocking, E. B., Washington, D. C.

**Peanut and Coffee Roaster.**

Olsen, A. B., Kansas City, Mo.

**Perforated Metal.**

Clinton Wire Cloth Co., Clinton, Mass.

Harrington & King Perforating Co., Chicago, Ill.

Hendrick Mfg. Co., Ltd., Carbondale, Pa.

**Phosphor Bronze.**

Phosphor Bronze Smelting Co., Limited, Philadelphia.

**Phosphor Tin.**

Crescent Phosphorized Metal Co., Philadelphia, Pa.

Halk & Naumann, 616 Pearl, N. Y.

**Picks and Mattocks.**

Plumo, Fayette M., Philadelphia, Pa.

**Pig Forcipes.**

Reimers, J. N., Davenport, Ia.

**Pig Iron.**

Houston, C. B. & Co., Philadelphia, Pa.

Montour Iron & Steel Co., Danville, Pa.

Keylor & Co., 45 Wall, N. Y.

Piling & Crane, Philadelphia, Pa.

Samuel, Frank, Philadelphia, Pa.

**Pig Iron Storage.**

Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.

**Pig Lead.**

Missouri Metal Co., St. Louis, Mo.

**Pne Drivers.**

Vulcan Iron Wks., Chicago, Ill.

**Pipe, Bent.**

National Pipe Bending Co., New Haven

**Pipe Cutting and Threading Machines.**

Signal & Keeler Mfg. Co., St. Louis, Mo.

Merrill Mfg. Co., Toledo, O.

Panocast Henry B. & Co., Philadelphia

launders' Sons, D., Yonkers, N. Y.

**Pipe Grips.**

Fretless Vise Co., 44 Barclay, N. Y.

**Pipes, Fittings, &c., Makers of.**

McNab & Harlin Mfg. Co., N. Y.

**Pipe, Water and Gas, Makers of.**

Cumberland Nail & Iron Co., Phila., Pa.

Donaldson Iron Co., Emaus, Pa.

Riverside Iron Works, Wheeling, W. Va.

Wood, R. D. & Co., Philadelphia, Pa.

**Plane Irons, Manufacturers of.**

Snack Bros., Millbury, Mass.

**Planes, Manufacturers of.**

Stanley Rule & Level Co., N. Y.

**Plated Ware.**

Boatman, L. & Son, New Haddar, Ct.

Holmes & Edwards Silver Co., Bridgeport, Conn.

Rogers, Wm. Mfg. Co., Hartford, Ct.

**Plate, Iron and Steel, Mfrs of.**

Extra-Standard Iron & Steel Co., Bridgeport, O.

Lukens Iron & Steel Co., Coatesville, Pa.

**Mahoning Valley Iron Co., Youngstown, Ohio.**

McDonnell-McLean Co., Pittsburgh, Pa.  
 McLean & Sons, Reading, Pa.  
 McLean Iron Co., Pottsville, Pa.  
 Pottsville Iron & Steel Co., Pottsville, Pa.  
 Singer, Nimick & Co., Pittsburgh, Pa.  
 The Mahoning Valley Iron Co., Youngstown, O.  
 Youngstown Iron & Steel Co., Youngstown, O.  
 Wood Alan Co., Philadelphia.

**Plating, Nickel, Brass and Silver.**

Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.

**Plow Shares.**

Star Mfg. Co., Carpentersville, Ill.

**Pokes.**

Bishop, A. W., Berea, Ohio.

**Polishing Machines.**

Watson & Stillman, 204 E. 43d, N. Y.

**Post Hole Diggers.**

Buckeye Mfg. Co., Union City, Ind.

Gibbs Mfg. Co., Canton, Ohio.

Gibbs, Jno. H. & Co., 113 Chambers, N. Y.

Wister, L. & R., & Co., Philadelphia, Pa.

**Poultry Nettings.**

Sarnum, E. T., Detroit, Mich.

Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.

N. J. Wire Cloth Co., Trenton, N. J.

"Silver Finish."

Tyler Wire Wks. Co., W. S., Cleveland, O.

Wright & Colton Wire Cloth, Co., Worcester, Mass.

**Powder.**

Lafin & Rand Powder Co., 29 Murray

New York Powder Co., 62 Liberty St., N. Y.

**Power Hack Saws.**

Millers Falls Co., 93 Reade St., N. Y.

**Power Hammers.**

Menell & Eisenhardt, Philadelphia.

Dupont Mfg. Co., St. Johnsbury, Vt.

Leahy & Lurie, Heliopolis, Pa.

Scranton & Co., New Haven, Conn.

**Presses, Dies, &c.**

E. W. Bliss Co., Brooklyn, N. Y.

Crosby, G. A. & Co., Chicago, Ill.

Ferracute Mch. Co., Bridgeton, N. J.

Stark Mch. & Tool Co., Buffalo, N. Y.

Stiles & Parker Press Co., Brooklyn, N. Y.

Waterbury Mch. Co., Waterbury, Conn.

**Presses, Power, Makers of.**

Bliss, W. Co., Brooklyn, N. Y.

Manville, E. J. Mch. Co., Waterbury, Ct.

Stark Mch. & Tool Co., Buffalo, N. Y.

Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.

**Pruners.**

Topliff & Ely Co., Elyria, Ohio.

**Pulleys.**

Keystone Clutch Mch. Wks., Phila., Pa.

Lake, J. H. & D. Co., Massillon, Ohio.

Reeves Pulley Co., Columbus, Ind.

**Pulley Fixings.**

Foley, J. W. & Co., Cincinnati, O.

**Pumping Machinery.**

Dean Bros. Steam Pump Works, Indianapolis, Ind.

Hooker-Collville Steam Pump Co., St. Louis, Mo.

Lucas, C. O. & Co., Greenville, Ohio.

McCowan, J. H. & Co., Cincinnati, O.

Maslin, J. & Son, Jersey City, N. J.

Norwalk Iron Wks. Co., So. Norwalk, Conn.

Southward Fdy. & Mch. Co., Phila., Pa.

Valley Pump Wks., Easthampton, Mass.

Worthington, Henry R., 86 & 88 Liberty St., N. Y.

**Pumps, Makers of.**

Bellevue Pump Co., Bellevue, Iowa.

Pemung Co., Salem, O.

Douglas, W. & B., Middletown, Conn.

Mast, Ross & Co., Springfield, O.

Myers, F. E. & Bro., Ashland, O.

**Punches and Shears, Hand and Power.**

Bertsch & Co., Cambridge City, Ind.

E. W. Bliss Co., Brooklyn, N. Y.

Cockburn Barrow & Mch. Co., Jersey City, N. J.

Crosby, G. A. & Co., Chicago, Ill.

Ferracute Mch. Co., Bridgeton, N. J.

Henderer, A. L., Wilmington, Del.

Stark Mch. & Tool Co., Buffalo, N. Y.

- Allentown Rolling Mill.** Allentown, Pa.  
**Lockhart Iron & Steel Co.,** Pittsburg, Pa.  
**Passaic Rolling Mill Co.,** Paterson, N.J.  
**Pottsville Iron & Steel Co.,** Pottsville, Pa.  
**Roberts, A. & P. Co.,** Phila., Pa.  
**The Phoenix Iron Co.,** Phila., Pa.
- Shears and Scissors.**  
**Asme Shear Co.,** Bridgeport, Conn.  
**Reinischs, R. Sons Co.,** Newark, N. J.
- Sheet Iron and Steel, Manufacturers of.**  
**Atna-Standard Iron and Steel Co.,** Bridgeport, O.  
**Cambridge Iron & Steel Co.,** Cambridge, Ohio.  
**Chess Bros.,** Pittsburgh, Pa.  
**Mahoning Valley Iron Co.,** Livingston, Ohio.  
**Moorehead-McCleane Co.,** Pittsburgh, Pa.  
**Pierston & Co.,** 29 Broadway, N. Y.  
**Singer, Nimick & Co., Ltd.,** Pittsburgh, Pa.  
**The Mahoning Valley Iron Co.,** Youngstown, O.  
**Alan Wood Co.,** Philadelphia.  
**W. Dewees Wood Co.,** McKeesport, Pa.
- Sheet Zinc.**  
**Mathlessen & Hegeler Zinc Co.,** La Salle, Ill.
- Shelf Brackets.**  
**Koch, A. B. & Co.,** Peoria, Ill.
- Sinks.**  
**Douglas, W. & B.,** Middletown, Conn.
- Skates, Ice.**  
**Lovell, Jno. P. Arms Co.,** Boston, Mass.  
**Winslow, Saml.,** Skate Mfg. Co., Worcester, Mass.
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**Union Hardware Co.,** Torrington, Conn.  
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| Bevin Bros. Mfg. Co.                      | 86  | Church, Isaac.                      | 120 | Eicken & Co.                      | 19    | Hogan, John L. & Co.                 | 17     |
| Bickford Drill & Tool Co.                 | 50  | Cincinnati Corrugating Co.          | 15  | Electric Cutlery Co.              | 76    | Hoggson & Pettis Mfg. Co.            | 49     |
| Bicycle Step Ladder Co.                   | 92  | Cincinnati Mfg. Co.                 | 99  | Ellwood Shafting & Tube Co.       | 17    | Hollands Mfg. Co.                    | 66     |
| Bigelow, C. R.                            | 56  | Cincinnati Milling Mch. Co.         | 53  | Enterprise Mfg. Co. of Pa.        | 94    | Holmes & Edwards Silver Co.          | 78     |
| Biggall & Keeler Mfg. Co.                 | 43  | Claflin Mfg. Co.                    | 39  | Erie Engine Works.                | 30    | Hooker-Colville Steam Pump Co.       | 56     |
| Billings & Spencer Co.                    | 110 | Clancy, J. R.                       | 65  | Ette & Henger Mfg. Co.            | 114   | Houston, C. B. & Co.                 | 17     |
| Bingham, W. Co.                           | 86  | Clapp, Geo. M.                      | 56  | Etting, Edw. J.                   | 17    | Howard Iron Works.                   | 65     |
| Birmingham Iron Foundry.                  | 23  | Clark, G. P.                        | 114 | Eureka Cast Steel Co.             | 128   | Howard & Morse.                      | 7      |
| Bishop, A. W.                             | 50  | Clark & Cowles.                     | 5   | Evans-Friction Cone Co.           | 3     | Hulbott & Howson.                    | 6      |
| Bissell, E. Son & Co.                     | 58  | Clark Mfg. Co.                      | 88  | Eynon-Evans Mfg. Co.              | 32    | Hulbert-Rogers Mch. Co.              | 49     |
| Blair Mfg. Co.                            | 116 | Clarke, Thomas.                     | 78  | F. & N. Mfg. Co.                  | 117   | Huyett & Smith Mfg. Co.              | 49     |
| Blake & Johnson.                          | 14  | Clauss Shear Co.                    | 76  | Fairmount Machine Co.             | 51    | Ideal Machine Works.                 | 58     |
| Bliss Co., E. W.                          | 40  | Clement & Dunbar.                   | 65  | Fay, J. A. & Egan Co.             | 50    | Ideal Mfg. Co.                       | 86     |
| Boardman, L. & Son.                       | 78  | Clendenin Bros.                     | 14  | Fearing, Wm. S.                   | 2     | Illinois Central R. R.               | 58     |
| Bogert, John L.                           | 52  | Cleveland Block Co.                 | 104 | Ferracute Machine Co.             | 41    | Illinois Pure Aluminum Co.           | 92     |
| Boker, Hermann & Co.                      | 18  | Cleveland City Forge & Iron Co.     | 98  | Fitch, Alfred & Co.               | 74    | Indiana Bicycle Co.                  | 87     |
| Bond Nail Co.                             | 14  | Cleveland Rubber Works.             | 98  | Fitch, W. & E. T.                 | 127   | Indiana Wire Fence Co.               | 7      |
| Boone, W. C. Mfg. Co.                     | 24  | Cleveland Stamping & Tool Co.       | 92  | Fitchburg Machine Works.          | 38    | Ives, H. B. & Co.                    | 111    |
| Booth, The Lloyd Co.                      | 25  | Cleveland Stone Co.                 | 53  | Fitzsimons & Co.                  | 17    | Jacobus, W. H.                       | 120    |
| Borden & Lovell.                          | 7   | Cleveland Twist Drill Co.           | 48  | Flagg, Stanley G. & Co.           | 128   | Jarecki Mfg. Co.                     | 45     |
| Borgner, Cyrus.                           | 25  | Clinton Wire Cloth Co.              | 8   | Foley, J. W. & Co.                | 49    | Jeffrey Mfg. Co.                     | 38     |
| Boston Gear Works.                        | 30  | Cobb & Drew.                        | 6   | Foos Mfg. Co.                     | 52    | Jenkins Bros.                        | 1      |
| Bourke Mfg. Co.                           | 97  | Coburn Trolley Track Mfg. Co.       | 102 | Fraim, E. T.                      | 105   | Jenkins & Lingle.                    | 42     |
| Box, Alfred & Co.                         | 57  | Cockburn Barrow & Machine Co.       | 114 | Frankford Steel Co.               | 19    | Jenner, H. W. T.                     | 6      |
| Boyce Rivet Co.                           | 128 | Coes, Loring & Co.                  | 111 | Franklin, H. H. Mfg. Co.          | 57    | Jessop, Wm. & Sons.                  | 18     |
| Bradlee & Co.                             | 16  | Coes Wrench Co.                     | 111 | Frassé Co.                        | 65    | Johns, H. W. Mfg. Co.                | 15     |
| Brass Goods Mfg. Co.                      | 2   | Coffin & Leighton.                  | 45  | Fray, Jno. S. & Co.               | 68    | Johnson, I. H., Jr., & Co.           | 50     |
| Bridgeport De-oxidized Bronze & Metal Co. | 2   | Colburn, A. M.                      | 46  | Frost Thill Spring Co.            | 109   | Johnson, S. C.                       | 91     |
| Bridgeport Gun Implement Co.              | 88  | Colby Wringer Co.                   | 95  | Fulton Iron & Engine Works.       | 50    | Jones, B. M. & Co.                   | 21     |
| Bridgeport Mch. Tool Works.               | 54  | Coldwell Lawn Mower Co.             | 116 | Fulton Steam Boiler Wks & Foundry | 30    | Jones & Lamson Machine Co.           | 62     |
| Briggs, Marvin.                           | 56  | Colliau, Victor.                    | 28  | Gardner, Jas. & Son.              | 25    | Jones, Jesse & Co.                   | 75     |
| Bristol Co.                               | 1   | Columbian Sash & Door Lock Co.      | 99  | Garrison, A., Foundry Co.         | 25    | Kayser, Ellison & Co.                | 18     |
| Britton, Horace E.                        | 69  | Conroy, P. J. & Co.                 | 109 | Garry Iron Roofing Co.            | 118   | Keeley, Jerome & Co.                 | 17     |
| Britton, J. Blodgett.                     | 27  | Continental Iron Works.             | 31  | Garry Iron & Steel Rfg. Co.       | 12    | Kelley & McBean.                     | 90     |
| Broderick & Bascom Rope Co.               | 6   | Corbin, P. & F.                     | 102 | Gartland Foundry Co.              | 28    | Kennedy, Julian.                     | 26     |
| Bronson Supply Co.                        | 95  | Corning, Edw. & Co.                 | 16  | Garvin Machine Co.                | 53-56 | Keuffel & Esser Co.                  | 60     |
| Brown, E. E. & Co.                        | 103 | Correspondence School of Mechanics. | 127 | Gautier Steel Department.         | 15    | Keys, W. W. & R. M. Co.              | 3      |
| Brown Hoisting & Conveying Mch. Co.       | 38  | Cotton, Barclay W. & Co.            | 16  | Gay & Parsons.                    | 82    | Keystone Clutch & Machine Works.     | 44     |
| Brown, H. H. Mfg. Co.                     | 118 | Covert Mfg. Co.                     | 107 | Gaylord, F. L. Co.                | 3     | Kilbourne & Jacobs Mfg. Co.          | 113    |
| Brown, R. H. & Co.                        | 64  | Covert's Saddlery Works.            | 63  | Gibbs Mfg. Co.                    | 114   | Kilmer Co.                           | 7      |
|                                           |     | Cox, Justice, Jr.                   | 17  | Gilbert & Bennett Mfg. Co.        | 8     | King & Andrews.                      | 60     |
|                                           |     | Cramp, Wm. & Sons S. & E. B. Co.    | 3   | Giazler Stove Co.                 | 63    | King, J. M. & Co.                    | 73     |
|                                           |     | Crescent Horse Shoe & Iron Co.      | 109 | Goodell Co.                       | 76    | Knap & Cowles Mfg. Co.               | 81     |
|                                           |     | Crescent Phosphorized Metal Co.     | 3   | Goubert Mfg. Co.                  | 35    | Koch, A. B. & Co.                    | 75     |
|                                           |     | Crescent Steel Co.                  | 20  |                                   |       | Kohler, F. E. & Co.                  | 114    |

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| Kreischer, B. & Sons.....           | 25       | Newark Machine Tool Works.....                    | 62      | Ripley Mfg. Co.....                  | 95      | Tatum, Sam. C. & Co.....                   | 94           |
| Krogsrud, W.....                    | 73       | New Castle Wire Nail Co.....                      | 14      | Riverside Iron Works.....            | 20      | Taunton Locomotive Mfg. Co.....            | 33           |
| La Belle Steel Co.....              | 22       | New England Screw Co.....                         | 12      | Roberts, A. & P. & Co.....           | 19      | Taunton Wire Nail Co.....                  | 6            |
| Lafin & Rand Powder Co.....         | 23       | New Haven Copper Co.....                          | 2       | Roberts Mfg. Co.....                 | 38      | Taylor & Boggis Foundry Co.....            | 23           |
| Lake, J. H. & D. Co.....            | 46       | New Haven Mfg. Co.....                            | 44      | Robertson, E. C.....                 | 57      | Thomson, W. H. & Co.....                   | 17           |
| Lane Brothers.....                  | 108      | New Haven Wire Mfg. Co.....                       | 6       | Robinson-Rea Mfg. Co.....            | 24      | Tiebout, W. & J.....                       | 104          |
| Lane & Bodley Co.....               | 30       | N. J. Wire Cloth Co.....                          | 8       | Rogers, The Wm. Mfg. Co.....         | 78      | Titchener, E. H. & Co.....                 | 7            |
| Lange Fence & Wire Co.....          | 8        | New Process Twist Drill Co.....                   | 48      | Rollason Gas Engines.....            | 30      | Tod, Wm. & Co.....                         | 31           |
| Lansing Wheelbarrow Co.....         | 112      | Newton & Shipman.....                             | 18      | Rome Brass & Copper Co.....          | 2       | Toledo Metal Wheel Co.....                 | 86           |
| Laughlin, Alex. & Co.....           | 26       | N. Y. Belting & Packing Co.....                   | 39      | Romer & Co.....                      | 105     | Toledo Wheelbarrow Works.....              | 113          |
| Lay, Jos. & Co.....                 | 99       | N. Y. Mallet & Handle Works.....                  | 69      | Rowland, Wm. & Harvey.....           | 128     | Toomey, Frank.....                         | 56           |
| Lea, J. Tatnall & Co.....           | 22       | N. Y. Powder Co.....                              | 23      | Russell, Burdall & Ward.....         | 128     | Topliff & Ely Co.....                      | 78           |
| Lean, D. R. Co.....                 | 27       | N. Y. Iron Roofing & Corrugating Co.....          | 12      | Russell & Erwin Mfg. Co.....         | 100     | Torrey, J. R. Razor Co.....                | 75           |
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| Le Count, C. W.....                 | 109      | Nicholson File Co.....                            | 73      | St. Louis Bronze & Aluminum Works    | 3       | Co.....                                    | 23           |
| Lee, Jesse & Son.....               | 98       | Nicolls, Wheeler & Co.....                        | 16      | Sabin Machine Co.....                | 4       | Tower & Lyon.....                          | 89           |
| Leechburg Foundry & Machine Co..... | 28       | Niles Tool Works.....                             | 57      | Salem Wire Nail Co.....              | 14      | Townsend, W. P. & Co.....                  | 120          |
| Leg's, Jno. S. Son & Co.....        | 128      | North Bros. Mfg. Co.....                          | 19 & 63 | Samson Cordage Works.....            | 1       | Trenton Iron Co.....                       | 4            |
| Leonard, B. E.....                  | 111      | Northampton Cutlery Co.....                       | 76      | Samuel, Frank.....                   | 16      | Trethewey Mfg. Co.....                     | 26           |
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| Leschen, A. & Sons Rope Co.....     | 6        | Norton Emery Wheel Co.....                        | 53      | Scattergood, H. W.....               | 60      | Tyler Wire Works Co. W. S.....             | 62           |
| Levis, Henry & Co.....              | 21       | Norton & Jones Machine Tool Works.....            | 38      | Scheeler & Sons.....                 | 9       | Union Hardware Co.....                     | 89           |
| Lidgerwood Mfg. Co.....             | 128      | Norwalk Iron Works Co.....                        | 36      | Schneider & Trenkamp Co.....         | 66      | Union Lock & Hdw. Co. Ltd.....             | 12           |
| Lindsay, Jas. G. & Co.....          | 17       | Nubian Iron Enamel Co.....                        | 32      | Schrivver, O. P. & Co.....           | 67      | Union Mfg. Co.....                         | 47           |
| Link-Belt Engineering Co.....       | 42       | Obermayer, S. Co.....                             | 20      | Scott, Geo. M.....                   | 38      | Union Metallic Cartridge Co.....           | 1            |
| Lockhart Iron & Steel Co.....       | 22       | Ogden & Wallace.....                              | 21      | Seaville Mfg. Co.....                | 2       | U. S. Projectile Co.....                   | 44           |
| Lovell, Jno. P. Arms Co.....        | 86       | Old Dominion Iron & Nail Works Co.....            | 109     | Seranton Forging Co.....             | 107     | Valentine, M. D. & Bro.....                | 25           |
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| Ludlow-Saylor Wire Co.....          | 7        | Ostrander, W. R. & Co.....                        | 64      | Seneca Falls Mfg. Co.....            | 50 & 70 | Van Dorn Iron Works Co.....                | 7            |
| Lufkin Rule Co.....                 | 92       | Otto Gas Engine Works.....                        | 32      | Sessions Foundry Co.....             | 24      | Vanderbilt Sash Balance Co.....            | 103          |
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| Lunkenheimer Co.....                | 31       | Palmer & De Mooy.....                             | 24      | Sherrwood Mfg. Co.....               | 30      | Vulcan Iron Works.....                     | 29           |
| McCabe, J. J.....                   | 56       | Palmer Hardware Mfg. Co.....                      | 64      | Shipley, A. B. & Son.....            | 75      | Wals & Roos Punch & Shear Co.....          | 42           |
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| McClure, Amsler & Co.....           | 27       | Peabody & Parks.....                              | 95      | Sickels, Sweet & Lyon.....           | 118     | Wardlow, S. & C.....                       | 18           |
| McCoy, Jos. F. & Co.....            | 105      | Peck, A. G. & Co.....                             | 128     | Sidney Steel Scraper Co.....         | 114     | Washburn, B. D.....                        | 93           |
| McFarland, Wm.....                  | 4        | Penn Iron Roofing & Corrugating Co.               | 9       | Sigourney Tool Co.....               | 45      | Washburn & Moen Mfg. Co.....               | 4            |
| McGowan, J. H. & Co.....            | 36       | Pennsylvania Bolt & Nut Co.....                   | 118     | "Silver Finish".....                 | 5       | Waterbury Brass Co.....                    | 2            |
| McIlvain, Wm. & Sons.....           | 27       | Penna. Diamond Drill & Mfg. Co.....               | 26      | Silver Mfg. Co.....                  | 52      | Waterbury Farrel Foundry & Machine Co..... | 36           |
| McKay, Jas. & Co.....               | 17       | Pennsylvania Mch. Co.....                         | 55      | Simonds Mfg. Co.....                 | 70      | Waterbury Machine Co.....                  | 47           |
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| McLean, John.....                   | 30       | Philadelphia Drop Forge Co.....                   | 25      | Smith, H. D. & Co.....               | 109     | Wellman Iron & Steel Co.....               | 16           |
| McLeod & Henry Co.....              | 25       | Philadelphia Engineering Wks.....                 | 27      | Smith, J. D. Foundry Supply Co.....  | 24      | Wells Bros. & Co.....                      | 47           |
| McNab & Harlin Mfg. Co.....         | 31       | Philadelphia Lawn Mower Co.....                   | 115     | Smythe, S. R. Co., Inc.....          | 28      | Western Foundry Co.....                    | 28           |
| Machinists' Supply Co.....          | 56       | Phillips, A. J. & Co 75, 78, 87, 92, 95, 98 & 103 |         | Snell Mfg. Co.....                   | 82      | Western Wheel Works.....                   | 86           |
| Mackey, James T.....                | 30       | Phillips, Townsend & Co.....                      | 14      | Smith & J. C. & Co.....              | 23      | Wetherell Bros.....                        | 18 & 22      |
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| Main Belting Co.....                | 39       | Phoenix Iron Co.....                              | 16      | Sommer's Son, John.....              | 128     | White, A. A. & Co.....                     | 73           |
| Main & Co.....                      | 90       | Phoenix Iron Works Co.....                        | 30      | Southark Foundry & Machine Co.....   | 30      | White, L. & I. J. Co.....                  | 75           |
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| Merrill Bros.....                   | 26       | Poole, Robt. & Son Co.....                        | 35      | Star Mfg. Co.....                    | 111     | Williamsport Wire Rope Co.....             | 6            |
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| Miller & Van Winkle.....            | 4        | Portland Lawn Sprinkler Co.....                   | 114     | Steam Gauge & Lantern Co.....        | 95      | Wilson, J. Fred.....                       | 120          |
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| Miner & Peck Mfg. Co.....           | 43       | Pownall, F. H.....                                | 24      | Sternbergh, J. H. & Son.....         | 119     | Wister, L. R. & Co.....                    | 21           |
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| Monarch Cycle Co.....               | 87       | Prentiss Tool & Supply Co.....                    | 55      | Stiles & Parker Press Co.....        | 40      | Wolf, C. H.....                            | 91           |
| Monce, S. G.....                    | 92       | Prentiss Vise Co.....                             | 68      | Stirling Co.....                     | 30      | Wolff, R. H. & Co. Ltd.....                | 6            |
| Monroe Refrigerator Co.....         | 99       | Pullman Sash Balance Co.....                      | 7       | Stocking, E. B.....                  | 6       | Wollensak, J. F.....                       | 68, 70 & 104 |
| Montour Iron & Steel Co.....        | 21       | Putnam Nail Co.....                               | 108     | Stokes Mfg. Co.....                  | 86      | Wood Alan & Co.....                        | 17           |
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| Moorhead-McCleane Co.....           | 22       | Randolph & Clowes.....                            | 1       | Stow Mfg. Co.....                    | 48      | Woodward & Rogers.....                     | 86           |
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| Naylor & Co.....                    | 21       |                                                   |         |                                      |         |                                            |              |

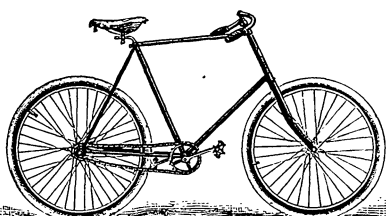
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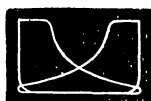


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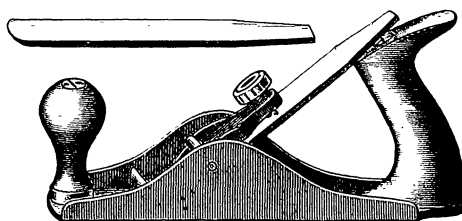
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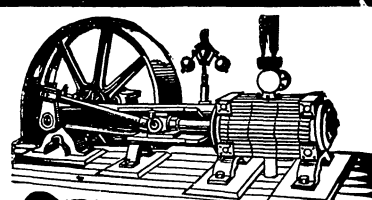
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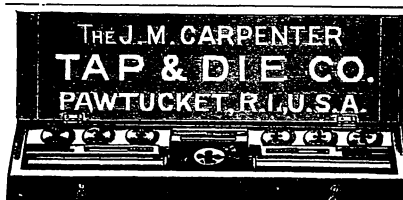
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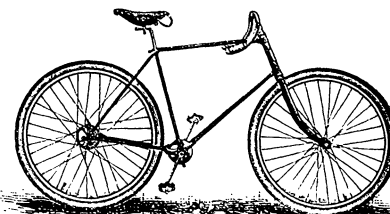
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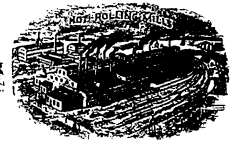
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| 8x3        | $\frac{1}{2}$ to $2\frac{1}{4}$ | 8 in                     | 68               | 88               |
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# THE IRON AGE

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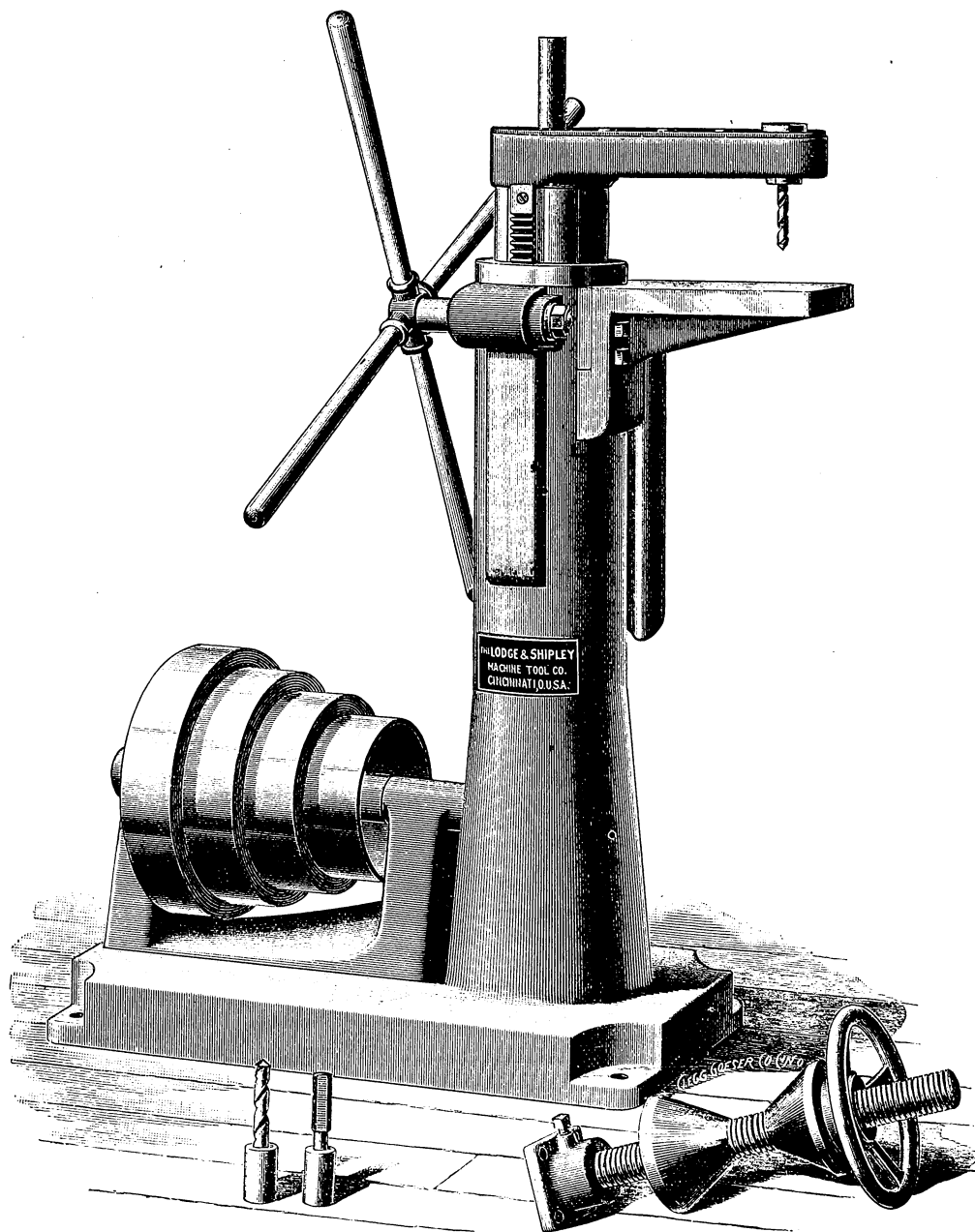
## Pulley Drilling and Tapping Machine.

The Lodge & Shipley Machine Tool Company of Cincinnati have designed a machine for the use of such shops as have a great many pulleys, fly wheels or other work requiring setscrews. It is intended

the machine. The pilot wheel governs the feed, the sliding head being balanced so as to be extremely sensitive. The sleeve is bored taper so as to receive the bushings shown, which are splined on the outside along their length and squared at the upper end to receive ordinary machinists' hand taps.

printing all the United States postage stamps for the next four years, a work hitherto always performed by private contractors.

A contract for a moderate amount of cast iron pipe was closed recently for delivery at Yonkers, N. Y., at \$21.85,



PULLEY DRILLING AND TAPPING MACHINE.

to be set at the edge of a pit and will then drill and tap pulleys from 12 inches in diameter by 20 inches face to a diameter of the limit of the pit by 20 inches face. The small pulleys can be handled to advantage where the number of arms will permit it. Three detachable arbors for holding the work are furnished with each machine, the smallest size being like the one shown in the foreground. The drills and taps are driven through a train of gears by the upright shaft shown, which is driven in its turn by a pair of steel bevel gears at the base of

The drill holders have also a slot to receive the flatted end of the drill. In addition to this, small set screws are used to hold the drills and taps up into place. A set of these tools is furnished with each machine, consisting of  $\frac{1}{8}$ ,  $\frac{3}{16}$ ,  $\frac{1}{4}$  and 1 inch. A friction countershaft, with reverse motion, is also provided. The weight of the machine is 800 pounds.

The Government Bureau of Engraving and Printing has been awarded a contract by the Postmaster General for

delivered. The interesting statement is made that the city paid in 1873, when it made its first purchase, \$57 per ton. This furnishes a good illustration of the tremendous decline in prices which has taken place during the past twenty years.

The total municipal receipts of New York City during last year were \$39,346,290, while the city's expenses were \$36,550,352, leaving a balance in the treasury of \$2,795,938.

## Management of Men and Workshops.

## SIXTH PAPER.

## Developing Skill.—Does it Pay?

BY THOS. D. WEST.

Few factors, injurious alike to the interest of employer and employees, can be cited than the lack of skill many men display in the manipulation of manufacture. Work requires more or less brain power in all industries. The more study and experience can develop skill the more valuable become the services and time of the workman.

When by investigation we find that there are but few industries that do not suffer for the want of good skilled employees, and that instead of progressing they are degenerating, it is very evident that a universal movement inaugurated among manufacturers to educate and develop skill would be as beneficial to the employee as the employer.

The work of man in the pursuit and maintenance of civilized life may be distinguished as that of the professional or the artisan. In obtaining education and skill to follow either, a course of schooling or training is necessary. While the former is taught in the college, the other is obtained in the factory or workshop. The ability and knowledge acquired upon entering life as a professional man or as an artisan depends upon the length of time given up to college discipline or trade apprenticeship. While in the artistic or professional pursuits the demands are constantly growing more exacting, with the artisans or tradesmen the reverse is the practice permitted to-day. The discussion of the causes is not the aim of this paper. Suffice it to say that the standard of ability and skill in many of the trades is lowering, for the old school of mechanics and good workmen are fast passing away.

The professional man is going up and the mechanic is going down. They are pulling apart from each other at an alarming rate, to the injury of all concerned. It surely is as essential for the mechanic to be a master of his calling as it is for the professional man to be of his. Probably it is the greater intelligence of the latter which accounts for the quicker appreciation of the advantages to be derived by the possession of knowledge and skill.

The fact that professional men, by often giving 25 years of early life to study or learning a profession, can often accumulate sufficient in ten years to make them independently wealthy, should cause artisans or mechanics to perceive that high wages should not be expected without a return of equivalent in ability for the wages received. If our most intelligent citizens recognize and follow the practice of giving up years of early life to study ere expecting recompense in after years, there must be some good reason for it. It is about time that the artisan commenced to connect cause and effect and make an effort to retard the too often downward course of artisans' skill. The employers should bring facts to the front to prove to their employees that it pays to expend sufficient time and energy in early life to become thoroughly proficient in a trade or occupation in order that middle life may be so remunerative as to make their last years yield to them independence.

I cannot but think that if this matter were rightly presented and taken hold of by employers, a great influence could be

brought to bear on youths or beginners.

The lack of skill exhibited to-day in many of our industries is wholly due to the haste of beginners to receive what they call "man's wages." I think it safe to say that this predominates and is tolerated in America much more than in Europe. We find foreign tradesmen much more proficient in many of our callings than those schooled in America, because their apprenticeship years are more numerous than ours. In this country apprenticeship lasts from one month up to three years. The indifference which manufacturers seem to exhibit to this condition of affairs is not only injurious to themselves but to the workmen or employees, for the great majority never start young enough or stay long enough as apprentices at any trade to become sufficiently skilled to give an equivalent for good wages.

Just as quick as many can obtain an elementary knowledge of a trade, they go off to bluff their way through life, and as there is but little else on the market or running loose for hire, a firm generally must engage them. All through their engagement it is nothing but bickering, discontentment and strife to get out good work without loss of time and stock. As a general thing the unskilled employee is constantly asking for more money and raising a disturbance in general, for it is very seldom that one can find a "poor tool" capable of minding his own business or being satisfied with anything near the equivalent he gives for wages. Generally he thinks himself as good as the most proficient employee; such is characteristic of "poor tools." One is always safe in figuring for losses, contention and worry when they are about, but thanks to the occasional dull periods in business, the "poor tool's" services can then be dispensed with. The employer can then take a little pleasure in life or feel his soul is his own, while the "poor tool" becomes a tramp, seeking whom he can next worry and impose upon. But after all it becomes a question who is to be most sympathized with. Surely the "poor tool" ere he is "fired" many times and sees others retained in his place must commence to realize his mistake in not having given more time to perfecting himself in youth at his trade or calling.

This brings us back again to the question of haste exhibited by youth to enter manhood for the duties of life ere he is equipped sufficiently with knowledge and experience to make the fight. Thirty to fifty years back a youth never thought of anything other than serving five to seven years learning a trade, if it was at all worthy such a name, and not only was he generally "bound" to give such time, but in some cases we are told that in Europe he was liable to imprisonment should he attempt to run away. Instead of his receiving money, in many instances payment would be demanded from him in consideration of obtaining the privilege to secure a chance to learn a trade. In those days boys were not men, and they well knew that if they would attempt to assert independence before they had acquired knowledge to entitle them to having man's diplomas (experience and ability) they would receive such a set back that it would cause them to think there was much in the maxim, "He grew to the size of a man but had the brains of a goose." "The laborer is worthy of his hire" is far from the justice of enactment that existed in past years, for then the laborer himself figured upon giving an equivalent

for every cent he received. To-day it is more figuring to "get in time."

There is not a sufficient number of skilled men for the work this world demands, and the "poor tools" by combination are not always going to be able to depress or hold down those of ability or skill. The attractions of this age over those of the past for labor are such that they should induce men to exert themselves to become skilled workmen, so as to receive the higher wages. It requires but little effort on the part of those who believe and realize that it is but just that experience and ability should be rewarded, to start the artisan in the direction of acquiring more proficiency in his calling. Of course, "poor tools" may improve themselves in some lines most every day, but at what a cost to the employer! Even then it generally would take ten years experience to gain the knowledge which could be obtained in one year through the proper apprenticeship, for two reasons: 1, that a young person grasps ideas, learns quicker and maintains knowledge longer than if obtained when an adult. 2, the simple matter of his being an apprentice implies that he is under instructions and has teachers who should give him attention and the value of their experience. An intelligent teacher can express in four or five words what he has learnt through years of practice.

You cannot as easily make skilled employees out of men as you can out of boys. I well know that many excuses are offered for the degeneration of skill. A good many cry, we don't have the opportunity, too much of specialty business going on. Isolate, fence them off, consider specialty shops as of another realm, and yet with present conditions it would be about the same old song, "I do wish I could hire a few good, experienced, skilled men; they are getting worse and worse every day."

It is not going to remedy matters to ignore the truth and set up a visionary ghost to scare us from the road which could lead us onward to improvement. If we want to create or make good, skilled employees, there should be more opportunities to-day than in the past. We can obtain to-day good and thorough information to understand the principles of nearly every trade. We need not simply practice imitating, as had to be done ten years back or further. We need not "go it blind" or be guided by "rule of thumb." We can know what should be done to meet with success. The old school had not the knowledge of science and principles nor the advantages which the workman can obtain to-day. What is most required at the present time is to have the apprentice attach more value to obtaining the privilege to fully or thoroughly learn a trade and less to the question of wages. He will then find that there are just as good opportunities for learning a trade now as in the times of the old school.

Through the costly teaching of experiment and experience the old school simply knew that work had to be done in a certain manner. Why? was a question very few, if any, were able to answer. Give us our old school of "bound apprenticeship" combined with our advanced knowledge of the principles and science of our trades and the best old school mechanics or skilled men could easily be surpassed by the new school in giving an equivalent for high wages.

But many employers are not clamoring at present for an improvement over

the old mechanics. Many of them would be well satisfied with men equal to the old mechanics. To obtain them we must turn back and pick up the discipline that made skilled men out of boys many years back. What was that? I can surmise being asked by youth. It was not a course, my young American buck, that, with your high strung notions, is expected to receive favor in your mind. But as you have asked the question I will tell you, and by putting the introduction in the shape of a "wild West" story, you may be interested sufficiently to follow me into starting into a solution of the problem.

Your first move is, of course, to hunt for an opening that will suit your inclination and talents; and before getting on the trail of it you will often meet many disappointments. Still, the experience you will receive will cause you to only appreciate the prize the more when obtained. Your adventures may lead you far from friends and home, but to strive for honors you find accorded to the famed experienced old heads you must be willing to undergo any and all forms of sacrifice and hardship if only at the end you can come out a thoroughbred. Now to reach that in a trade is not achieved in a month, or in a year or two. In many occupations it requires from five to seven years at low wages and endurance of hardships.

Now we wait your answer. Do you want to start in? You will be left some privilege; you can kick once in a while, but if too many off goes your head, for remember there was no fooling or wasting time with boys having the "big head" when the rule of the old school was in force. Then you were not considered a man until you had obtained a fair amount of knowledge and good common sense. If you started at 14, at 21 you should possess it and enter manhood with sufficient knowledge and skill in your trade to command and give an equivalent in work for good wages. You would do as well starting with six years of apprenticeship at an average of only \$6 per week, and following that with your first four years' wages as a journeyman or skilled artisan, averaging \$18 per week, as you would had you served three years at \$8 per week and the first seven years as a journeyman at \$12 per week. The latter is large wages for the majority of "poor tools" that are turned out these days in many trades. Figures will now show that in ten years the amount of money received is exactly the same in both cases. Now, before going further, I would ask if you can discover what could be deduced from the above. You hesitate; well it is simply this: That every day you now continue to work at the trade you average \$1 per day more for your labor than if you had only served a three years' apprenticeship. Do you fully realize what this means? No? I thought so. It is just the way you have realized everything else that is best for your own interest. Well, as your past has proved how purblind you are to see any further ahead than your nose, I suppose we will have to knock it into you, and to do so we will suggest or allow you a life of 30 years more as a journeyman.

|                                 | Three-year apprenticeship. | Six-year apprenticeship. |
|---------------------------------|----------------------------|--------------------------|
| Weeks in a year.....            | 52                         | 52                       |
| Wages per week.....             | \$8.00                     | \$6.00                   |
| Wages per year.....             | \$416.00                   | \$312.00                 |
| Years apprenticeship.....       | 3                          | 6                        |
| Total apprenticeship wages..... | \$1,248.00                 | \$1,872.00               |

|                                  | Seven years journeyman-ship. | Four years journeyman-ship. |
|----------------------------------|------------------------------|-----------------------------|
| Weeks in a year.....             | 52                           | 52                          |
| One week's wages.....            | \$12.00                      | \$18.00                     |
| One year's wages.....            | \$624.00                     | \$936.00                    |
| Journeyman years.....            | 7                            | 4                           |
| Journeyman wages....             | \$4,368.00                   | \$3,744.00                  |
| Apprenticeship wages.            | 1,248.00                     | 1,872.00                    |
| Ten years' wages.....            | \$5,616.00                   | \$5,616.00                  |
| Thirty years' journeyman-ship.   |                              |                             |
| \$1.00 per day.....              | \$28,080.00                  |                             |
| 2.00 per day.....                | 18,720.00                    |                             |
| Bonus for ability and skill..... | \$9,360.00                   |                             |

Having reached this point you cannot but perceive how dearly you have paid for this "big head" privilege of which you thought so much while serving an apprenticeship of three months to three years. Here you see just that because you could not deny yourself a little pleasure and independence in the first years of your life you have sacrificed virtually \$10,000, a young fortune actually thrown away.

You lost an opportunity of being "somebody" who would be sought after, and by your skill be assured of steady work; instead you go into the world as a "poor tool" to be knocked from pillar to post; you will be more than likely to be half your time out of employment and the other half be an object for censure and abuse.

Youth is the schooling time of life. A rebuff is simply given as a reprimand to awaken boys to make an effort to do better, but during manhood years rebukes are a slur on ability or skill, and in many cases lead to discharge.

It is best that they be received in youth, when forgotten in five minutes, while in manhood years they will ever be remembered and redound to their discredit and debar them from many of the comforts and pleasures they might have taken in the companionship of man, duties and responsibilities of life.

There is one element in the figures here presented which by a close reader may be called into question, and that is that one apprentice should average \$8 per week for three years, while another should average only \$6 per week for six years. Since a modern apprentice and his backers insist on his receiving large wages, the employer, in order to not lose by the contract, gets the apprentice perfected in doing one thing just as quick as he can. At that he keeps him just as long as he can, so as to get an equivalent in work out of him for the large apprentice wages he insists on receiving. Then, again, the proprietor, having no "bond" or guarantee that an apprentice will stay any more than a day or a month, often finds it necessary to get all out of the apprentice that is possible while he may remain. If he only knew that the apprentice was to stay a definite long time it would, generally speaking, be to the employer's interest to start him in at the bottom and gradually work him up to the top, with practice in every line of his work. If the employee will only reason this out he cannot but perceive the common sense of such a position. This may be "letting a cat out of the bag," but the secret is now divulged and it should be a pointer to not be too exacting in the question of wages, but to try to get a chance at more than one thing in a firm's manufacture. In fact, endeavor to secure a chance at learning and having practice in all that may pertain to the trade or calling. This working or having experience at only one or two things in a trade is what "floods our lands" with "poor tools," and causes many to have a smattering of

several trades. They master none because they float from one to another trade in the hope of bettering themselves.

Let a chance to thoroughly learn all there is in a business be our first consideration, and the question of wages come second, as was the practice of the old school. In the end it does pay to develop ability, and now more than ever should the employer and employee labor to develop the much required skill, for in this question their interests or welfare are at least mutual.

### Trade of Principal Ports.

The Bureau of Statistics, at Washington, has just issued a comparative statement of the values of merchandise imports and exports, by customs districts, for the years 1893 and 1892, which shows that little change took place in the relative position of the principal commercial ports of the United States during the past year. The figures for all ports the imports and exports of which exceeded \$10,000,000 in value are given as follows:

| Imports.           |               |  |               |
|--------------------|---------------|--|---------------|
|                    | 1893.         |  | 1892.         |
| New York.....      | \$492,110,000 |  | \$539,800,000 |
| Boston.....        | 69,100,000    |  | 75,500,000    |
| Philadelphia.....  | 58,800,000    |  | 63,200,000    |
| San Francisco..... | 39,400,000    |  | 45,600,000    |
| New Orleans.....   | 21,100,000    |  | 18,800,000    |
| Chicago.....       | 17,700,000    |  | 17,000,000    |
| Baltimore.....     | 15,000,000    |  | 14,100,000    |
| Exports.           |               |  |               |
|                    | 1893.         |  | 1892.         |
| New York.....      | \$357,900,000 |  | \$377,700,000 |
| New Orleans.....   | 35,200,000    |  | 107,600,000   |
| Boston.....        | 83,500,000    |  | 88,800,000    |
| Baltimore.....     | 74,800,000    |  | 91,900,000    |
| Philadelphia.....  | 43,500,000    |  | 60,300,000    |
| Galveston.....     | 35,900,000    |  | 35,600,000    |
| San Francisco..... | 28,800,000    |  | 31,700,000    |
| Savannah.....      | 23,500,000    |  | 20,300,000    |
| Charleston.....    | 11,000,000    |  | 11,300,000    |
| Norfolk.....       | 10,600,000    |  | 8,300,000     |
| Newport News.....  | 10,500,000    |  | 11,600,000    |

The total of merchandise imports for the whole country for 1893 shows a shrinkage of about \$64,000,000 and the exports a decrease of \$62,000,000 as compared with 1892. In imports there is no change in the order of the seven ports named, but New Orleans, Chicago and Baltimore alone show any increase, while the four most important receiving ports—New York, Boston, Philadelphia and San Francisco—all exhibit a material falling off. In the case of exports, the only changes in the relative rank of the principal shipping ports during 1893 are that Boston, by virtue of a lesser shrinkage in her exports than is shown by Baltimore, goes ahead of that city, taking the third place after New York and New Orleans, while Norfolk, which did not appear on the list last year, takes precedence of Newport News. All the Southern ports except New Orleans make a fair showing, while the Northern ports uniformly reflect the business depression of the year by a shrinkage of more or less magnitude in their shipments.

Taken as a whole, remarks the New York *Journal of Commerce*, the year's record is notable rather as an evidence of the extent to which even the most distant ports and the commerce of the whole country reflect the same influences, than as an indication of any remarkable development of new branches or routes of trade, or changes in the relative commercial importance of different cities or sections.

Business is picking up in the New England cotton and woolen industries. Most of the mills are now running, many on full time and with a full force, consequently the distress among the textile operatives is abating.

### Handling Steel Products by Electrical Power.

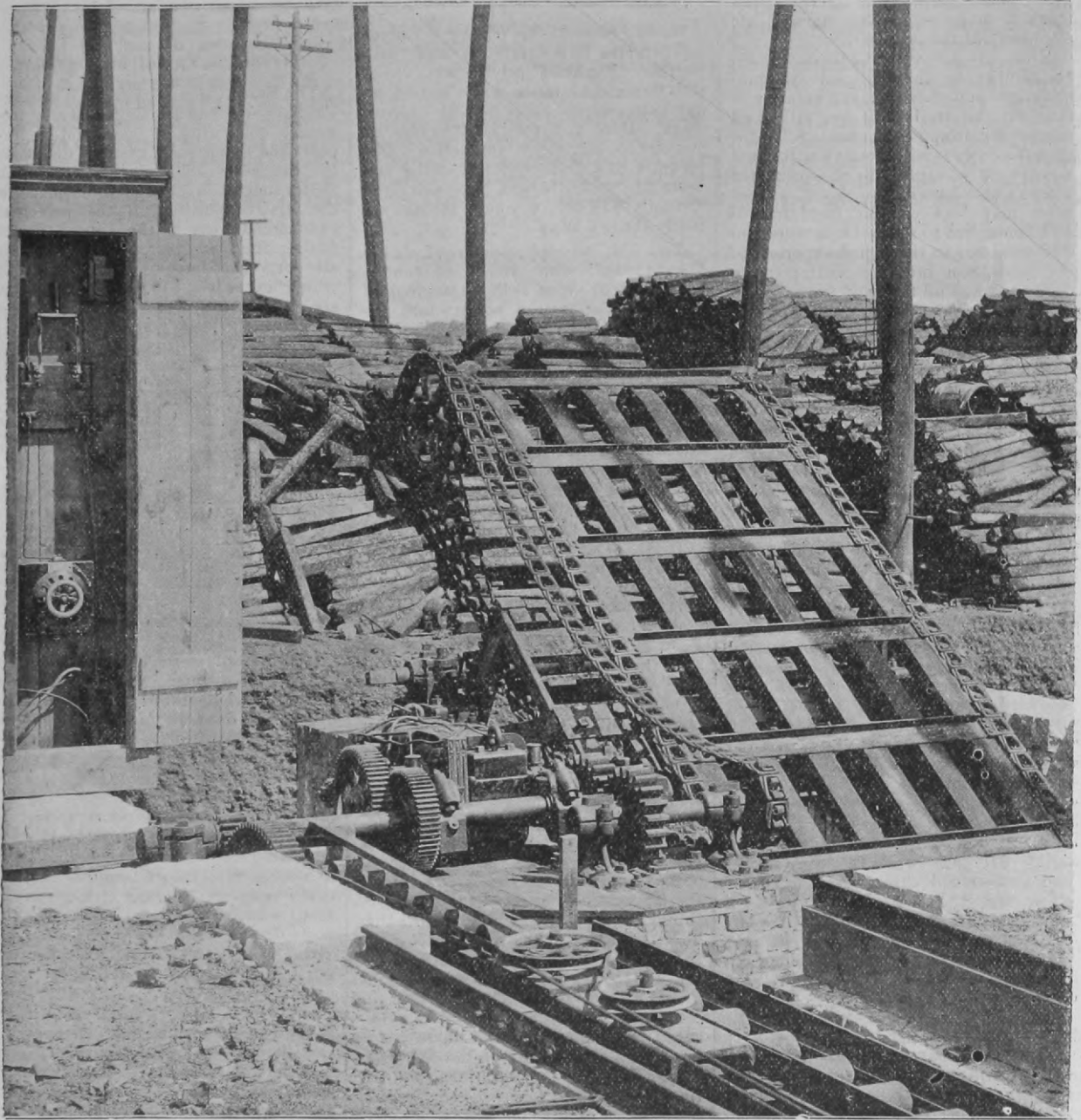
At the present time no department of the electrical industry presents a more favorable outlook than that of power transmission for large factories. Where power is needed in several buildings of a large manufacturing concern, or even in the case of one large building, it is

machinery at the Joliet, Ill., works of the Illinois Steel Company, illustrated by the accompanying pictures.

The illustration on this page shows the apparatus employed in loading the steel billets on to flat cars. After coming from the mill the billets are piled up in the yard until wanted for shipment. The loading of the cars is accomplished with the minimum amount of manual labor by the employment of

It works well and has resulted in a great saving in labor.

An exceptionally interesting motor application is that shown in Fig. 2, which illustrates the electro-hydraulic ingot charging machines used for the heating furnaces. There are two of these machines, and each is practically a transfer table 35 feet long and 15 feet wide running on two tracks. In the center of this table, running lengthwise,



ELECTRIC BILLET HOIST AT JOLIET.

found that greater economy and convenience can be obtained by the establishment of a central generating station, transmitting the power by electricity and utilizing it with motors. Long lines of shafting or distinct steam plants are thus done away with, and in either case a marked saving can usually be effected, while the driven machinery can ordinarily be operated with less exertion on the part of the workman. Where electrical power is thus used ingenious adaptations of motors to do work not usually associated with electricity are frequently found. A case in point is that of the electrically operated

the electrically operated machinery shown. The billets are delivered to a long line of rollers, partly shown at the left in the illustration, and are thus carried along until they strike a deflecting plate, which causes them to fall on an endless moving apron, set on an incline, as prominently shown in the picture. This apron first elevates and then drops the billets on the car to be loaded, which is on a depressed railroad track on the further side. This loading machine is driven by a 25 horse-power 500-volt motor, as shown, the controlling switch and the rheostat being conveniently placed in a tiny switch house.

is an adjustable frame, which is capable of being raised or lowered by hydraulic pressure from cylinders on either side. Running on this frame is a carriage carrying a heavy pair of jaws studded with steel teeth for gripping the ingot. These jaws can be opened, closed, raised or lowered, drawn in or out, at the pleasure of the operator, who is stationed on an elevated platform near the upright tanks, by means of levers which control the water pressure. Of the two tanks shown in the illustration one is the pressure tank, capable of containing a pressure of 500 pounds per square inch, while the other is a storage tank,



into which the water is discharged after being released from the cylinders. This pressure is obtained by a triplex pump driven by a 25 horse-power motor, so controlled that when the pressure reaches 500 pounds the motor is stopped automatically, but as soon as it falls below this pressure the motor is again started, thereby keeping a uniform pressure in the tank. The traversing motion on the tracks is accomplished by a 15 horse-power motor of the railway type geared directly to one of the axles of the track wheel.

The operation of the machine is as follows: An ingot is placed on the "buggy" which runs on a track in front of the heating ovens, and stopped in front of the oven to be charged. The operator on the charging machine pulls a cord, and by means of compressed air the heavy iron door of the oven is

through the mill out into the yard for a distance of about 600 feet. By means of a deflecting arm these billets are distributed to any point in the yard.

All of the motors are wound for 500 volts. The current for the charging machines is obtained from two overhead trolley wires, from which it is taken by two trolley wheels, as shown in Fig. 2. Except the trolley wires, all the conductors are laid in lead covered cables.

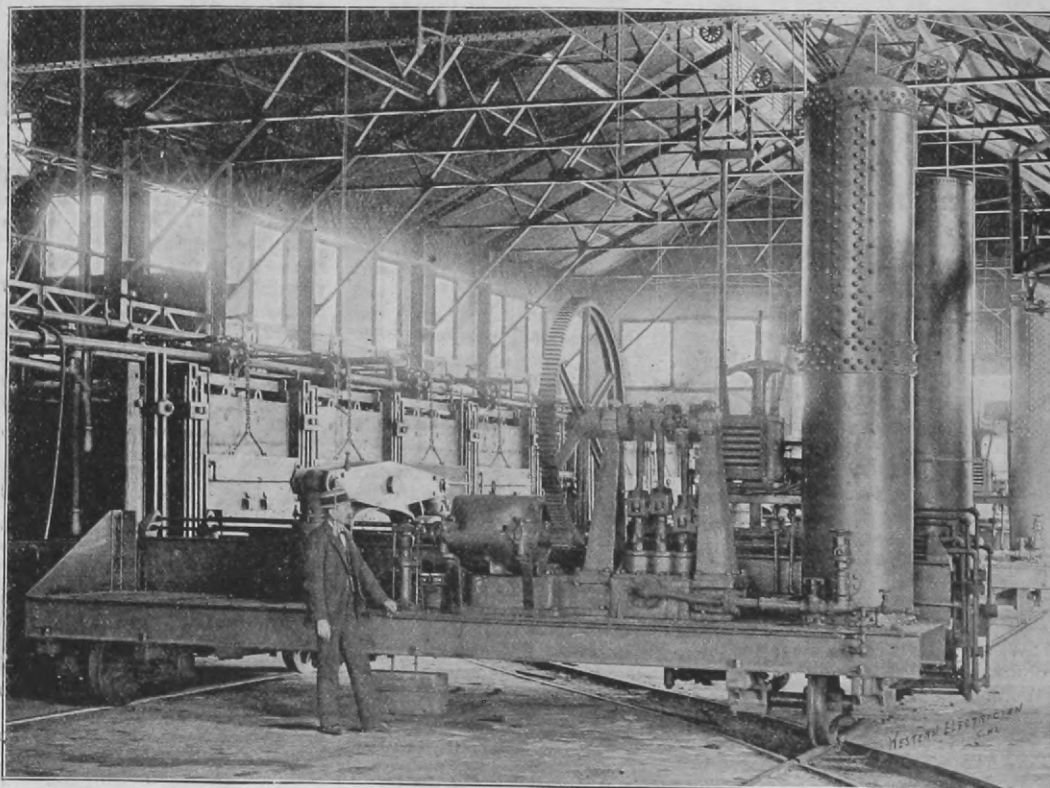
For the foregoing article and the use of the cuts we are indebted to the *Western Electrician* of Chicago.

Senator Palmer of Illinois has introduced a bill in the national legislature which has for its purpose the shortening of the terms of patents in certain cases. It provides that inventors may

the most difficult and costly enterprises of its kind in existence. The route involves the construction of no less than 60 tunnels and 52 bridges.

#### The Colorado Steel Works.

The following interview with President Osgood, of the Colorado Fuel & Iron Company, regarding the sale of \$2,000,000 worth of bonds of that company, appears in the *Pueblo Chieftain*: While the loan was decided to be necessary from the first talk of consolidation and did not arise in the least from the panic, yet, when I started operations in September last, there was a decided prejudice against us pretty much everywhere. This has entirely disappeared, and in New York, and in fact in all the financial centers I have visited, I have



ELECTRIC CHARGING MACHINE FOR HEATING FURNACES AT JOLIET.

raised. He then brings the machine to a position behind the ingot, and by means of the levers, opens the jaws, grasps the ingot, which has been standing in a vertical position, and allows it to swing into a horizontal position. Then, by a second lever, he slides the ingot into the oven, raising or lowering it by a third lever, as the case may require. Should the ingot be heated on one side and it be desired to turn it over, it is gripped by the jaws, and by another lever the jaws are rotated so as to completely turn it over. The method of withdrawing an ingot is the same in reverse order. To move the table from one oven to another a lever controlling the rheostat operates the traversing motor.

The heated ingot on being withdrawn from the oven is placed on the "buggy" and drawn in line with the rolls, where it is reduced in size and cut up into billets, which fall on an endless chain of rolls, which are operated by an independent motor of 25 horse-power capacity. These rolls rise to an elevated trestle, which runs

obtain two or more patents upon unusual proceedings, whether the invention be capable of division mechanically or on physical lines, or the applications differ merely in the form or scope of claims presented; provided that all such patents shall be issued on the same day, or if not so issued each of the later ones shall be issued only for the unexpired portion of the term of the first one granted, so as to cause them all to expire together. Purchasers under any such patents shall not be required to pay royalty under the others or any of them. The issuance of two or more patents to the same inventor containing the same claims is prohibited.

Incendiaries are persistently endeavoring to burn down the World's Fair buildings in Chicago. Last week they succeeded in destroying the dome of the Agricultural Building.

A line of railway, 150 miles in length, now being built between Caracas and Valencia, in Venezuela, will be one of

found a decided conviction, often mingled with surprise, that Colorado has recovered more rapidly than any other part of the country from the national crash of last summer. Capitalists and investors, while they often shake their heads over our distinguished Governor and denounce him as no good, are still agreed that the State is all right.

What do we propose to do with the money? Oh, many things. It will go to increasing our plant and improving it up to date. In this way we expect to enlarge our output materially and at the same time decrease the ratio of expense. This will enable us to make exceedingly tempting propositions to a large number of big industries that now pay enormous freight bills to get their goods here, but which might just as well be using our Colorado raw material and save their cash. Take tool steel, for example, there's an immense quantity of that used here—not a bit but comes from the East at present. We'll change that. Then there's structural iron and any number of other items I could mention.

## The Mining Engineers.

### The Virginia Beach Meeting.

The twenty-fourth annual meeting of the American Institute of Mining Engineers was held last week at the Princess Anne Hotel, Virginia Beach, near Norfolk, Va. A good many of the members availed themselves of special facilities tendered by the Bay Line, plying between Baltimore and Norfolk, taking passage on Monday evening on the famous packet "Alabama," built by the Marine Department of the Maryland Steel Company.

Among the members present were H. M. Howe of Boston; Professor Richards, E. C. Eustis of Boston; W. J. Sheaffer and Arthur W. Sheaffer of Pottsville, Pa.; J. S. Hartshorne and W. Webster of Pottstown; R. G. Jeckie of Nova Scotia; J. K. Landis of Philadelphia; Major J. W. Powell, Dr. David T. Day, Dr. S. F. Emmons, Dr. Becker, N. H. Darton and Richard Parker of the United States Geological Survey, Washington; W. H. Johnson, Longdale Iron Company, Longdale, Va.; W. J. Taylor and H. D. Hibbard of the Taylor Iron & Steel Company, High Bridge, N. J.; W. H. Wiley, New York; Dr. R. W. Raymond, New York; Walter Russel, Russel Wheel & Foundry Company, Detroit, Mich.; W. H. Jaques, ordnance engineer, Bethlehem Iron Company, South Bethlehem, Pa.; J. C. Platt of Waterford, N. Y.; Harry R. Hall of the Carbon Iron & Pipe Company, Parryville, Pa.; J. W. Cabot and Axel Sahlin of the Maryland Steel Company, Sparrow's Point, Md.; H. M. McCormick, Harrisburg, Pa.; Geo. Ormrod, Allentown, Pa.; S. M. Pitman, Philadelphia; A. L. Walker of the Baltimore Copper Works, Baltimore; C. R. Ellicott of Charlotte Furnace, Rochester, N. Y.; N. S. Hungerford, Jersey City Spike & Bolt Works, Jersey City, N. J.; P. N. Moore, St. Louis; W. G. Wilkins, Pittsburgh, Pa.; Pemberton Smith, Buffalo; Dr. Leonard Waldo, Waldo Foundry Company, Bridgeport, Conn.; James Platt, Gloucester, England; L. W. Francis, Port Henry, N. Y.; W. B. Cogswell, Syracuse, N. Y.; and Spruille Braden, Helena, Mont.

On their arrival at Norfolk the party, reinforced by many members coming from Washington, were received and entertained by the local committee and the Norfolk Chamber of Commerce. The rest of the morning was spent in an inspection of the town of Norfolk, a special train on the Norfolk, Albemarle & Atlantic Railroad conveying the engineers to Virginia Beach, where they were quickly installed comfortably in the charming Princess Anne Hotel.

In opening the first session on Tuesday evening, Dr. H. M. Howe of Boston, president, dwelt on the development of the institute and suggested the possibility of further improvement through two lines of work. He referred to the desirability of obtaining through solicitation, conducted with skill and tact, papers and contributions to discussion, which would bring out a good many valuable results of experimental work which now never reach the public. He put forward the idea also that a review of the literature of the metallurgy of the baser metals, of ore and coal mining and concentrating be prepared regularly for the "Transactions." These subjects are not now given much attention in the abstracts published by

the Iron and Steel Institute and the Institution of Civil Engineers.

The principal feature of the session was the delivery of a lecture on the World's Fair, accompanied by a beautiful series of lantern slides, by Dr. R. W. Raymond of New York.

After a brief delay a large party of ladies and gentlemen left on Wednesday morning for Norfolk, where they were joined by a number of guests from that city and vicinity. The steamer "Luray" carried the party first to the famous terminal facilities of the Norfolk & Western Railroad. Particular interest was given to the two great iron and coal shipping docks, from which the large tonnage of Pocahontas coal is annually shipped.

The next visit was to the Newport News Shipbuilding Company, to whose great plant *The Iron Age* has repeatedly referred. The American liner "New York" was in the dry dock, the only one in the country capable of receiving so large a ship. The vessel is merely undergoing general repairs, the engines being dismounted and being overhauled in the shops. After partaking of a luncheon at the Hotel Warwick, at which Horace See of New York represented the hosts, the steamer sailed to the Hampton Institute, where Indians and negroes are instructed. Headed by a band, of whom all but two were Indians, the youths of the Hampton Institute passed in review. All then assembled in the main hall, where touching singing exercises by the boys and girls were conducted. To the ladies of the party the crowning event of the day, however, was the dress parade at Fortress Monroe.

Somewhat exhausted by a long day's excursion, a number of the engineers missed a highly interesting lecture by W. H. Jaques, ordnance engineer of the Bethlehem Iron Company, on the "Manufacture and Testing of Guns and Armor." Lieutenant Jaques traced the development of gun and armor manufacture in general and the rapid strides in progress in particular, in which this country has made so wonderful a record. The lecture was illustrated by over 150 lantern slides, many of which showed the very latest ballistic tests.

The first working session of the institute took place on Thursday morning, the secretary announcing the names of a large number of persons recommended for membership by the council. They were duly elected. Prof. W. H. Richards of the Massachusetts Institute of Technology, read a paper on "Close Sizing Before Jigging," in which he presented the results of several thousand observations made to illustrate a new law, which Professor Richards terms the "law of suction." Dr. Becker of the United States Geological Survey presented a summary of a paper on "The Torsional Theory of Joints," dealing with fissures in rocks, which was followed by C. R. Boyd of Wytheville, Va., on "The Correlation in the Coal Rocks West of Pocahontas, Flat Top, Va.," in which he dwelt upon the identity of the coals of the Flat Top and Quinimont fields.

Major Jed. Hotchkiss of Staunton, Va., who has been so closely identified with its development, spoke on "The Pocahontas Flat Top Coal Field and Its Extensions in the Light of a Decade of Development." The field, which has the form of an elongated oval, is 90 miles long and has an average width of 10 miles. It is tapped along the New River by the Chesapeake & Ohio Railroad and through the waters of the Big

Sandy and its tributaries by the Norfolk & Western road. It is thus naturally divided into three parts, the southern or Flat Top field, the middle or the C. & O. field and the northern or Gauley River portion. It is the first or Flat Top field to which Mr. Hotchkiss particularly referred. The field is controlled by the Flat Top Coal Land Association, which owns 196,950 acres of land in it. This concern does not mine or make coke, but simply leases the land to miners and coke producers. On December 31, 1883, it had thus under lease 26,016 acres of land, all the territory within easy access of the Norfolk & Western Railroad now being under lease. The first branch road to lands at a distance from the main stem is now under construction. The field has three good coal beds, dipping to the westward and gradually thinning out in that direction. The principal bed, and practically the only one now worked, is the famous No. 3 or Pocahontas bed. Mining was begun in 1882, but regular, important shipments did not take place until 1884.

During 1893 22 mines removed the coal from 300 acres, the yield being 2,311,592 tons, or an average actual yield of 7818 tons per acre. The width of the Pocahontas bed ranged from 6 to 8.4 feet, the theoretical yield being figured at 11,196 tons to the acre. Since the opening of the field the coal from 1700 acres has been mined out, yielding 15,005,909 tons, or 8818 tons per acre. Since the theoretical yield was 12,390 tons to the acre, the actual yield was 71 per cent. Since 1887 the shipments of coal and the product of coke have been as follows:

Coal and Coke Shipments from the Pocahontas Field.

| Year.     | Coal.     | Coke.   |
|-----------|-----------|---------|
| 1887..... | 1,028,141 | 138,566 |
| 1888..... | 1,376,009 | 180,462 |
| 1889..... | 1,692,485 | 276,042 |
| 1890..... | 1,798,720 | 381,345 |
| 1891..... | 2,259,777 | 353,384 |
| 1892..... | 2,517,880 | 390,736 |
| 1893..... | 2,711,327 | 454,566 |

The afternoon session opened with a paper by Arthur W. Sheaffer of Pottsville, Pa., entitled "Notes on the Re-working of Anthracite Culm Banks," in which he presented data from a number of coal washeries in the Schuylkill region, showing the shipments of three plants. In 1889 the Stanton bank shipped 5202 tons of stove, 4299 tons of chestnut, 3597 tons of pea, and 12,223 tons of buckwheat coal, about 60 per cent. of the bank being shipped from the breaker. In 1890 the same washing shipped 62,808 tons; in 1891, 72,074 tons, and in 1892, 50,151 tons, 63.32 per cent. being buckwheat, and 21.91 per cent. pea coal. Records are also given for the Draper and Furnace culm bank shipments.

Dr. Willard C. Hayes of Washington read a paper on "The Geological Relations of the Southern Appalachian Bauxite Deposits," which was followed by that of Francis Laur of Neuilly, France, entitled "The Bauxites: A Study of a New Mineralogical Family." In the absence of the author, it was read by the secretary. Both of the papers related to the mineral which has become so important during the past decade as the ore from which aluminum is manufactured, the deposits of the Southern States being particularly large and pure. Captain A. E. Hunt of the Pittsburgh Reduction Company referred to the importance from a commercial point of view of the development of large quantities of bauxite low in silica and oxide of iron. Even now there are being produced from the mines of Georgia and



Alabama from 700 to 1000 tons monthly of bauxite having less than 4 per cent. of silica and oxide of iron in the aggregate.

Captain Hunt then called the attention of the Institute to the prospective great importance of bauxite as a refractory material, now that it can be obtained cheaply with less than 2 per cent. of silica and little titanic acid. The material is almost infusible. By adding to bauxite a small amount of lime and bricking under pressure a strong brick is obtained, with which experiments are now being made. It is manufactured by Harbison & Walker of Pittsburgh and is soon to be tried in an open hearth furnace. It is also to be put into a tipping furnace building for casting aluminum bars. While the shrinkage is large, the trouble from that source is overcome by burning the brick twice at a high temperature.

From the standpoint of a consumer Dr. Waldo of Bridgeport referred to the desirability of producing even purer aluminum than that now on the market. In reply, Captain Hunt stated that the source of the impurities of the commercial aluminum, small as they are, is not the bauxite ore. The latter is purified by being dissolved, the alumina being subsequently precipitated with carbonate of soda.

Dr. Darton of the United States Geological Survey presented some data on the supply of water by artesian wells in Eastern Virginia.

#### The Physics of Steel.

Some time since the following comprehensive plan for a discussion of the physics of steel was proposed :

##### A.—The Physics of Steel.

(See papers of Messrs. Martens, Osmond, Pourceel, Sauveur, Hadfield, Howe and Webster.)

The following lines of discussion are suggested, but are not in any way exclusive:

- I. Correspondence between chemical composition and fracture, micro-structure and physical properties.
- II. Influence of—
 

|                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Casting temperature</li> <li>2. Manner and temperature of heating.               <ol style="list-style-type: none"> <li>(a) For rolling.</li> <li>(b) For annealing.</li> </ol> </li> <li>3. Work.</li> <li>4. Finishing temperature.</li> <li>5. Rate and mode of cooling.               <ol style="list-style-type: none"> <li>(a) After forging.</li> <li>(b) For casting.</li> </ol> </li> </ol> | } on | <ol style="list-style-type: none"> <li>(a) Fracture.</li> <li>(b) Micro structure.</li> <li>(c) Physical properties.</li> <li>(d) Tensile properties.</li> <li>(e) Residual stress.</li> </ol> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
- III. Segregation as affected by—
  1. Composition.
  2. Casting temperature.
  3. Rate of cooling.
- IV. Blow holes and pipes; their volume and position as affected by—
  1. Composition.
  2. Casting temperature.
  3. Casting pressure.
  4. Rate of cooling.
  5. Special additions.
  6. Forging.
- V. Hardening; relation between tensile properties and hardness of quenched steel, and—
  1. Quenching temperature.
  2. Quenching medium.
  3. Size of piece quenched.

The discussion was opened by Henry D. Hibbard of the Taylor Iron & Steel Company, High Bridge, N. J., who said :

**Blow Holes.**—In the manufacture of soft steel ingots, say, with less than 0.30 carbon, there are two methods which may be followed relating to treatment of the gases and thereby of the blow holes in the steel. The first is the plan usually followed in the manufacture of ingots for boiler plates, wire and similar purposes, which we may call the "evolution" method, inasmuch as the gases are not kept in solution during the teeming, but their free

escape or evolution is encouraged at that time, giving the well known scintillating effect in the molds. This effect is due to the escape of myriads of bubbles of gas, which throw up a shower of small scintillating sparks. The result of this is that when properly done the ingot will have a solid outer layer from 1 to 2 inches thick, then a zone with numerous gas bubbles with bright surfaces and inside that a pretty solid center. The holes above mentioned stick together pretty well in rolling and cannot be found in the finished piece unless it be known where and how to find them.

The position of the zone of holes is primarily dependent on the casting temperature. The higher this temperature the nearer the zone will be to the surface. When the heat is too high and the holes are so close to the surface that only a thin skin of steel covers them and the broken ingot shows a structure an inch or more deep around the outside, closely resembling honeycomb, the well known pitted steel, with which the majority of steel melters are but too familiar, is present.

The second plan, almost universally followed in the production of high carbon steel ingots and to some extent soft steel ingots as well, we may call the solution method, in which, by the addition to the melted steel shortly before casting of metals having great solvent power on the gases, these latter are kept in solution and the resulting ingot is free from blow holes, but will have a pronounced pipe unless some mechanical means is employed to prevent it. In the crucible process the solvent added is silicon, which is reduced from the slag and material composing the pot. In the other processes the additions are made from outside sources.

In the Swedish exhibit at the World's Columbian Exposition were ingots for the manufacture of plates ranging from 0.15 to 0.50 carbon, made by the solution method, the solvent evidently being aluminum. They were absolutely free from blow holes.

**Pipes.**—For many purposes where the very highest grade of product is not needed, incipient rising steel is commercially better than strictly piping steel. In the former the pipe is prevented or displaced by the few blow holes in the ingot and the expensive necessity of scrapping a quarter or perhaps a third of the ingot thereby obviated. The few blow holes themselves, being scattered and having bright surfaces, stick together to some extent in the rolling and hammering processes, as stated above. They do no appreciable harm, and are seldom if ever heard from. On the other hand, split rods and wire and split ends of boiler plates not infrequently result from the use of top ends of piped ingots. The temptation to use as much of the ingot as possible occasionally causes the line between sound and unsound steel to be overstepped.

**Casting Temperature.**—The influence of casting temperature on steel is manifold. As stated above, it affects most vitally the position of the zone of blow holes in the soft steel made by the evolution method. It influences greatly the amount of segregation in ingots. The higher the casting temperature the more the segregation. The rate of solidification of a steel ingot is influenced chiefly by the casting temperature, and has a great influence on the molecular structure or crystallization of the outer layer of the ingot, as noted by H. H. Campbell, which has a direct bearing on its behavior when worked

by rolls or hammer. If an ingot which has been made by the solution method and cast hot be broken across, a sort of columnar structure or arrangement in lines or planes normal to the cooling surface is seen on the fractured surface, and the hotter the steel the further into the ingot this structure extends. Probably the metal is weakened along these planes and liable to draw apart at some of them in the rolls. Annealing the ingot breaks up this formation. The effect, if there be any, of high casting temperature on the chemical composition is obscure. Possibly at high steel temperatures the affinity of manganese for oxygen is so much weakened that the deoxidation of the metal is incomplete, and the red shortness of the steel cast too hot may then be due partly to oxide of iron and oxide of silicon in the steel, partly to blow holes too near the surface and partly to the molecular constitution.

**Segregation.**—Metcalf in 1891 at the meeting of this institute announced the discovery that with the exception of carbon all desirable ingredients of steel were paramagnetic, while all undesirable ones except oxygen were diamagnetic. Carbon alone of the desirable elements was diamagnetic. The behavior of the ingredients of steel in regard to segregation seem to present a parallel case. As far as the analyses given in connection with the papers under discussion go, they show that the desirable elements in steel, with the exception of carbon, do not segregate strongly, while the undesirable ones do. It would be very interesting to have information on the segregating action of any or all of the long list of less common ingredients of steel, or rather one should say the less commonly determined ones, for some copper and oxygen, for instance, if not always, are almost always present. It is to be hoped that some of the investigators of the institute will find opportunity to follow up the trail of some of these elements in this regard while the scent is still warm.

To guard against segregation in ingots the following precautions may be observed:

1. Cast ingots of the smallest practicable size.
2. Cast ingots of as cold steel as practicable.
3. Cast ingots as slowly as practicable.
4. If the ingots must be large and segregation is very objectionable, then purer stock than otherwise needed must be used or allowance made to cut off from the top or out of the center enough steel to remove the parts containing the worst segregation, or both.
5. The method mentioned above of making what I called incipient rising steel must, it would seem, give ingots free from segregation. The steel in the molds is constantly in motion until the moment of solidification, and the impurities have no opportunity to collect anywhere. This method being applicable only to soft steels, however, it will give no assistance in overcoming segregation in large, high quality, hard steel ingots.

William R. Webster of the Pottstown Iron Company, Pottstown, Pa., presented data supplementary to those given in his admirable papers on the relations between the chemical constitution and physical character of steel. He submitted a letter from S. M. Vauclain, superintendent of the Baldwin Locomotive Works, Philadelphia, giving the following results of a series of

tests of two 8½ inch steel blooms furnished to them for forging axles:

These steel blooms were bought to a specification calling for a certain tensile strength and elongation in a test specimen cut from the blooms and drawn down to 1 inch square under the hammer. It occurred to Mr. Vauclain, through the failure of some large driving axles to pass the physical requirements of a customer, that the reason of the failure was that the steel blooms from which the axle had been forged had received little or no work at the mill, or in other words, that the blooms had been rolled from small ingots instead of from large ingots, as a failure had never been experienced from forgings made from blooms 6½ inches square. In order to determine whether such was the case two sample blooms were forged down to different sizes, from 8½ inches to 7 inches, from 8½ inches to 6 inches, to 5 inches and to 4 inches. It was found that the forging materially enhanced the value of the steel, as is shown in the figures given below. The elongation increased as the size of the forging diminished. In one of these blooms there was a high increase of tensile strength and in the other there was a slight reduction of tensile strength. Mr. Vauclain attributes this phenomena to this: that one of the blooms was allowed to remain its original size at the bottom of the ingot; this was the case in the specimen which showed an increase of tensile strength as the forging was reduced in size. On the result of this experiment the specification for steel blooms was changed to read that the test piece must be cut from the bloom furnished.

Mr. Webster comments on these figures as follows:

The poor stretch and crystalline fractures of the larger sections show clearly the trouble caused by improper treatment, while the greatly improved results in the smaller sizes give the true value of the material. By annealing the larger pieces, the stretch and fracture would no doubt be made equal to those of the smaller pieces in their present state, but it is only by carefully

tested, and found to meet the physical requirements, and were consequently satisfactory to us. It occurred to us

chased from parties where it was impossible to send for an analysis. You will notice that there is not a single

*Variations in Analyses of Boiler Steel.*

| Analyzed by              | Carbon. | Man-ganese. | Phos-phorus. | Sulphur. | Silicon. |
|--------------------------|---------|-------------|--------------|----------|----------|
| <b>A.</b> Otis.....      | 0.16    | 0.42        | 0.048        | 0.037    | .....    |
| Park.....                | 0.15    | 0.34        | 0.041        | 0.036    | .....    |
| Wellman.....             | 0.15    | 0.35        | 0.049        | 0.048    | .....    |
| Carnegie.....            | 0.16    | 0.38        | 0.055        | 0.028    | 0.018    |
| Lukens.....              | 0.14    | 0.33        | 0.042        | 0.044    | .....    |
| Average of A.....        | 0.152   | 0.364       | 0.041        | 0.0335   | .....    |
| <b>B.</b> Otis.....      | 0.17    | 0.39        | 0.024        | 0.024    | .....    |
| Park.....                | 0.20    | 0.35        | 0.024        | 0.026    | .....    |
| Wellman.....             | 0.20    | 0.36        | 0.031        | 0.027    | .....    |
| Carnegie.....            | 0.22    | 0.39        | 0.028        | 0.016    | 0.020    |
| Lukens.....              | 0.20    | 0.36        | 0.022        | 0.026    | .....    |
| Average of B. (fire box) | 0.198   | 0.362       | 0.058        | 0.0253   | .....    |
| <b>C.</b> Otis.....      | 0.16    | 0.76        | 0.035        | 0.025    | .....    |
| Park.....                | 0.16    | 0.71        | 0.033        | 0.028    | .....    |
| Wellman.....             | 0.16    | 0.74        | 0.032        | 0.029    | .....    |
| Carnegie.....            | 0.17    | 0.80        | 0.043        | 0.019    | 0.06     |
| Lukens.....              | 0.145   | 0.80        | 0.032        | 0.043    | .....    |
| Average of C.....        | 0.159   | 0.762       | 0.035        | 0.0288   | .....    |
| <b>D.</b> Otis.....      | 0.16    | 0.50        | 0.012        | 0.020    | .....    |
| Park.....                | 0.15    | 0.44        | 0.012        | 0.016    | .....    |
| Wellman.....             | 0.15    | 0.48        | 0.017        | 0.021    | .....    |
| Carnegie.....            | 0.15    | 0.49        | 0.010        | 0.014    | .....    |
| Lukens.....              | 0.14    | 0.47        | 0.010        | 0.029    | .....    |
| Average of D. (fire box) | 0.152   | 0.476       | 0.0122       | 0.020    | .....    |
| <b>E.</b> Otis.....      | 0.17    | 0.60        | 0.021        | 0.045    | .....    |
| Park.....                | 0.23    | 0.65        | 0.019        | 0.055    | .....    |
| Wellman.....             | 0.19    | 0.67        | 0.025        | 0.055    | .....    |
| Carnegie.....            | 0.23    | 0.68        | 0.026        | 0.047    | 0.014    |
| Lukens.....              | 0.21    | 0.61        | 0.019        | 0.067    | .....    |
| Average of E.....        | 0.206   | 0.642       | 0.022        | 0.0538   | .....    |
| <b>F.</b> Otis.....      | 0.16    | 0.36        | 0.049        | 0.049    | .....    |
| Park.....                | 0.20    | 0.30        | 0.050        | 0.050    | .....    |
| Wellman.....             | 0.17    | 0.31        | 0.057        | 0.057    | .....    |
| Carnegie.....            | 0.19    | 0.34        | 0.058        | 0.058    | 0.015    |
| Lukens.....              | 0.185   | 0.32        | 0.050        | 0.050    | .....    |
| Average of F.....        | 0.181   | 0.326       | 0.0528       | 0.0528   | .....    |

that the chemical composition of these steels might not be strictly in accordance with the specification we sent out

case wherein the analysis of the same piece by any two of the makers is the same, and some of them vary very much. It is impossible to believe that these differences are due entirely to the carelessness of the chemists employed by these different companies. I am of the opinion that more of it is due to the irregularity in the material, and demonstrates how unreliable a single analysis made from a steel plate can be. The letters to the left—namely, A, B, C, D, E and F—are the letters which we stamped upon the samples so that we might be able to distinguish them without letting it be known who the manufacturers of the samples were."

Mr. Webster comments on these figures as follows:

"The difference in the chemical determinations of C, Mn, P and S in same pieces of steel by the chemists of our leading steel works, as given by Mr. Vauclain, shows that there is great need of improvement in taking drillings or methods used. The greatest differences are:

Carbon, 0.17 to 0.23 = difference of 0.06 in plate E.  
Manganese, 0.33 to 0.4 = difference of 0.09 in plate A.  
Phosphorus, 0.041 to 0.055 = difference of 0.014 in plate A.  
Sulphur, 0.019 to 0.043 = difference of 0.024 in plate C."

Mr. Webster, in his earlier investigations, assigned to each metalloid, after an exhaustive comparison of physical tests and chemical analyses, a definite hardening effect, as expressed by

*Tests of Steel Axle Blooms.*

| Specimen.                            | Tensile strength. Pounds. | Elongation. Per cent. | Character of fracture. |
|--------------------------------------|---------------------------|-----------------------|------------------------|
| Original No. 1 bloom, 8½ inches..... | 89.417                    | 13                    | Crystalline.           |
| Original No. 1 bloom, 8½ inches..... | 90.184                    | 14                    | Crystalline.           |
| Forged to 7 inches.....              | 89.184                    | 16.5                  | Partly crystalline.    |
| Forged to 7 inches.....              | 89.051                    | 16.5                  | Partly crystalline.    |
| Forged to 6 inches.....              | 86.921                    | 18                    | Coarse cup fracture.   |
| Forged to 6 inches.....              | 86.189                    | 18                    | Coarse cup fracture.   |
| Forged to 5 inches.....              | 87.603                    | 18                    | Silky, cup.            |
| Forged to 5 inches.....              | 80.000                    | 20                    | Silky, cup.            |
| Forged to 4 inches.....              | 87.787                    | 22                    | Silky, cup.            |
| Forged to 4 inches.....              | 88.465                    | 21                    | Silky, cup.            |
| Original No. 2 bloom, 8½ inches..... | 86.106                    | 13                    | .....                  |
| Original No. 2 bloom, 8½ inches..... | 86.938                    | 16                    | .....                  |
| Forged to 7 inches.....              | 91.430                    | 16                    | .....                  |
| Forged to 7 inches.....              | 93.926                    | 16                    | .....                  |
| Forged to 6 inches.....              | 98.689                    | 17.5                  | .....                  |
| Forged to 6 inches.....              | 97.504                    | 17.5                  | .....                  |
| Forged to 5 inches.....              | 97.587                    | 18.5                  | .....                  |
| Forged to 5 inches.....              | 98.003                    | 19                    | .....                  |
| Forged to 4 inches.....              | 95.008                    | 20                    | .....                  |
| Forged to 4 inches.....              | 94.758                    | 20                    | .....                  |

conducted experiments that the best methods of working can be decided upon.

The letter from Mr. Vauclain also contained an interesting contribution to the question of uniformity of material. He says:

"I inclose you herewith a table showing the comparative results of analyses of various steels that we use for boiler purposes. These steels were bought to our regular boiler steel specifications,

for phosphorus and in order to obtain a correct idea of the chemical composition of the material it was decided to send a sample of each make of steel enumerated to all of the different makers. In other words, we took one piece of Otis steel and cut it into five parts, sending one part to Otis, one to Park, one to Wellman, one to Carnegie and one to Lukens. We did the same with the piece of Park steel and so on down through the list, with an odd piece pur-

pounds per square inch of tensional strength.

For some months the Pottstown Iron Company have graded all the steel by the table given in a former paper, and checked the grading by the forging tests as described in the paper of Joseph Hartshorne. The steel thus graded was bloomed for the plate orders. Then one slab was rolled into a plate for the order, and a tension test was made of this plate. By the result of this tension test we were guided in rolling the balance of the heat. Out of several hundred heats graded in this manner, 95 per cent. met the requirements of the orders in every respect and were accepted; but these results will no doubt be improved upon when the influence of sulphur is also considered.

The hardening effect of sulphur seems to be about 500 pounds per each 0.01 per cent. of increase. In the table accompanying the present paper the ultimate strength with 0.065 per cent. sulphur agrees with the old table where sulphur was not considered—that is, for all steels with less than 0.065 per cent. sulphur we now get lower results, and for those with more sulphur, higher results. Making this allowance for sulphur, the assumed ultimate strength of a  $\frac{3}{8}$  inch plate of pure iron is reduced from 38,000 pounds per square inch to 34,750 pounds. With this as a basis, I have constructed my new table, giving each of the elements carbon, phosphorus and manganese the same hardening effect as before, to wit:

Carbon is credited with a constant effect of 800 pounds per each 0.01 per cent.

Phosphorus shows greater effect in

high carbon than in low carbon steels. For 0.07 and 0.08 C, it has about the same effect as carbon—that is, 800 pounds for each 0.01 P. This increases to 1500 pounds per 0.01 P in 0.15 C steel, or nearly twice the effect of carbon. This increase in the effect of phosphorus as carbon increases is gradual, proceeding about as follows:

| For carbon. Hundredths per cent. | Increase of ultimate strength per 0.01 per cent. P. Added pounds. | Effect of unit of P to unit of C as 1 to |
|----------------------------------|-------------------------------------------------------------------|------------------------------------------|
| 9                                | 900                                                               | 1 $\frac{1}{2}$                          |
| 10                               | 1,000                                                             | 1 $\frac{3}{4}$                          |
| 11                               | 1,100                                                             | 1 $\frac{5}{8}$                          |
| 12                               | 1,200                                                             | 1 $\frac{7}{8}$                          |
| 13                               | 1,300                                                             | 1 $\frac{9}{8}$                          |
| 14                               | 1,400                                                             | 1 $\frac{11}{8}$                         |
| 15                               | 1,500                                                             | 1 $\frac{13}{8}$                         |
| 16                               | 1,500                                                             | 1 $\frac{15}{8}$                         |
| 17                               | 1,500                                                             | 1 $\frac{17}{8}$                         |

The effect per unit of manganese seems to decrease as the percentage of this element increases. For instance, steels of 0.20 and 0.30 Mn show greater difference in ultimate strength than steels of 0.50 to 0.60 Mn, all other elements being the same. I have endeavored to cover this point irrespective of the percentage of carbon or phosphorus, but upon further investigation it may be necessary to take one or both of these elements into account in estimating the effect of high and low manganese.

Assuming the first addition of 0.15 per cent. manganese to increase the ultimate strength 3600 pounds, we have:

| Increase in Ultimate Strength by Successive Increments of Manganese. |                                                        |                                                        |       |
|----------------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|-------|
|                                                                      |                                                        | Total increase in ultimate strength from 0. manganese. |       |
| Manganese, per cent.                                                 | Increase in ultimate strength. Pounds per square inch. | From.                                                  | To.   |
| 0.00                                                                 | 0.15                                                   | 8,900                                                  | 3,600 |
| 0.15                                                                 | 0.20                                                   | 1,200                                                  | 4,800 |

|      |      |       |        |
|------|------|-------|--------|
| 0.20 | 0.25 | 1,100 | 5,900  |
| 0.25 | 0.30 | 1,000 | 6,900  |
| 0.30 | 0.35 | 900   | 7,800  |
| 0.35 | 0.40 | 800   | 8,600  |
| 0.40 | 0.45 | 700   | 9,300  |
| 0.45 | 0.50 | 600   | 9,900  |
| 0.50 | 0.55 | 500   | 10,400 |
| 0.55 | 0.60 | 500   | 10,900 |
| 0.60 | 0.65 | 500   | 11,400 |

Silicon is so very low in this steel (there being only a trace) that its hardening effect has not been considered at all, but with other steels it should be considered.

Mr. Webster has subdivided the 408 tests given in his paper read at the Chicago meeting into three or four groups under each element considered. This, in some cases, does not give as many tests as could be desired from which to calculate averages, but all results are given on the accompanying table.

First, the number of tests in each group with the averages of the actual ultimate strengths. Next, the averages of the estimated strengths; these are deducted from the actual ultimates and the differences given with their proper signs. All of the above results are given for each mill and then for both mills. After this, under the same grouping, is given the percentage of tests that come within 3000 pounds, 4000 pounds and 5000 pounds of the estimated ultimate strengths. It has been my endeavor in this table of averages to bring out clearly and prove the effect of each element in order to further investigate the same.

An inspection shows that the estimated ultimates agree very closely with the actual ultimates. An exception to this is the group of actual ultimates of over 70,000 pounds, which indicates that the table of estimated ultimates is

Summary of Averages. 408 Tests.

|                                   | Tests.     |           | Universal mill ultimates. |             |             | 112 inch mill ultimates. |             |             | Ultimates for both mills. |             |             | Percentages of both mills. |                      |                      | After making corrections for size of plates.                            |
|-----------------------------------|------------|-----------|---------------------------|-------------|-------------|--------------------------|-------------|-------------|---------------------------|-------------|-------------|----------------------------|----------------------|----------------------|-------------------------------------------------------------------------|
|                                   | Universal. | 112-inch. | Actual.                   | Calculated. | Difference. | Actual.                  | Calculated. | Difference. | Actual.                   | Calculated. | Difference. | Within 3,000 pounds.       | Within 4,000 pounds. | Within 5,000 pounds. |                                                                         |
| Carbon:                           |            |           |                           |             |             |                          |             |             |                           |             |             |                            |                      |                      |                                                                         |
| 0.06, 0.07, 0.08, 0.09.           | 67         | 104       | 55,721                    | 56,119      | - 398       | 55,436                   | 55,316      | + 120       | 55,548                    | 55,630      | - 82        | 74.3                       | 88.3                 | 95.3                 | 89.8 per cent. come within 5,000 pounds, being a gain of 9.1 per cent.  |
| 0.10, 0.11, 0.12.                 | 82         | 98        | 61,250                    | 61,516      | - 266       | 61,159                   | 60,806      | + 353       | 61,200                    | 61,130      | + 70        | 70.6                       | 82.2                 | 94.4                 |                                                                         |
| 0.13, 0.14, 0.15, 0.16.           |            |           |                           |             |             |                          |             |             |                           |             |             |                            |                      |                      |                                                                         |
| 0.17, 0.18.                       | 22         | 35        | 65,293                    | 65,749      | - 451       | 67,927                   | 66,982      | + 945       | 66,912                    | 66,506      | + 406       | 61.4                       | 75.4                 | 80.7                 |                                                                         |
| Sulphur:                          |            |           |                           |             |             |                          |             |             |                           |             |             |                            |                      |                      |                                                                         |
| Under 0.02, 0.02, 0.03            | 27         | 53        | 57,480                    | 57,292      | + 188       | 55,869                   | 55,748      | + 121       | 53,413                    | 56,268      | - 145       | 83.8                       | 93.8                 | 96.3                 | 93.1 per cent. come within 5,000 pounds, being a gain of 3.5 per cent.  |
| 0.04, 0.05.                       | 90         | 94        | 58,819                    | 59,554      | - 735       | 59,302                   | 59,024      | + 278       | 59,065                    | 59,283      | - 218       | 72.8                       | 86.4                 | 94.0                 |                                                                         |
| 0.06, 0.07.                       | 54         | 90        | 61,976                    | 61,927      | + 49        | 62,234                   | 61,704      | + 530       | 62,138                    | 61,788      | + 350       | 61.1                       | 75.7                 | 89.6                 |                                                                         |
| Phosphorus:                       |            |           |                           |             |             |                          |             |             |                           |             |             |                            |                      |                      |                                                                         |
| Under 0.02, 0.02, 0.03            | 57         | 94        | 56,468                    | 56,092      | - 624       | 55,510                   | 55,758      | - 248       | 55,494                    | 55,884      | - 390       | 76.9                       | 89.5                 | 93.4                 | 92.8 per cent. come within 5,000 pounds, being a gain of 7.7 per cent.  |
| 0.04, 0.05, 0.06.                 | 82         | 106       | 60,019                    | 60,589      | - 570       | 60,913                   | 60,397      | + 516       | 60,523                    | 60,480      | + 43        | 68.8                       | 84.6                 | 95.2                 |                                                                         |
| 0.07, 0.03, 0.09.                 | 32         | 37        | 65,911                    | 65,164      | + 747       | 66,532                   | 65,212      | + 1,320     | 66,244                    | 65,190      | + 1,054     | 62.6                       | 70.1                 | 85.1                 |                                                                         |
| Manganese:                        |            |           |                           |             |             |                          |             |             |                           |             |             |                            |                      |                      |                                                                         |
| Under 0.20 to 0.40.               | 57         | 84        | 56,938                    | 56,955      | - 17        | 56,074                   | 55,728      | + 346       | 56,423                    | 56,224      | + 199       | 73.0                       | 84.4                 | 92.9                 | 90.0 per cent. come within 5,000 pounds, being a gain of 16.7 per cent. |
| 0.40 to 0.55.                     | 78         | 113       | 59,973                    | 60,531      | - 553       | 61,524                   | 60,836      | + 688       | 60,891                    | 60,711      | + 180       | 70.2                       | 85.3                 | 92.7                 |                                                                         |
| 0.55 to 0.75.                     | 36         | 40        | 63,028                    | 63,415      | - 387       | 61,833                   | 62,517      | - 684       | 62,409                    | 62,942      | - 533       | 68.4                       | 80.3                 | 93.4                 |                                                                         |
| Actual ultimates:                 |            |           |                           |             |             |                          |             |             |                           |             |             |                            |                      |                      |                                                                         |
| 46 to 54,000 pounds.              | 30         | 48        | 51,647                    | 53,561      | - 1,914     | 51,605                   | 53,110      | - 1,505     | 51,609                    | 53,288      | - 1,674     | 74.4                       | 88.5                 | 94.9                 | 90.0 per cent. come within 5,000 pounds, being a gain of 16.7 per cent. |
| 54 to 62,000 pounds.              | 89         | 123       | 58,415                    | 59,607      | - 1,192     | 58,511                   | 58,623      | - 87        | 58,493                    | 59,039      | - 546       | 76.9                       | 91.0                 | 96.2                 |                                                                         |
| 62 to 70,000 pounds.              | 42         | 46        | 64,509                    | 62,663      | + 1,846     | 65,685                   | 65,639      | + 46        | 65,124                    | 63,083      | + 2,041     | 61.2                       | 73.9                 | 89.8                 |                                                                         |
| Over 70,000 pounds.               | 10         | 20        | 78,461                    | 70,703      | + 7,758     | 71,863                   | 68,809      | + 3,054     | 72,398                    | 69,441      | + 2,957     | 46.7                       | 56.7                 | 73.3                 |                                                                         |
| By chemistry:                     |            |           |                           |             |             |                          |             |             |                           |             |             |                            |                      |                      |                                                                         |
| 46 to 54,000 pounds.              | 21         | 37        | 52,241                    | 52,389      | - 148       | 51,858                   | 52,148      | - 290       | 51,997                    | 52,235      | - 238       | 84.5                       | 100.0                | 100.0                | 90.0 per cent. come within 5,000 pounds, being a gain of 16.7 per cent. |
| 54 to 62,000 pounds.              | 95         | 135       | 58,366                    | 58,602      | - 236       | 58,429                   | 58,098      | + 331       | 58,399                    | 58,306      | + 93        | 71.7                       | 83.0                 | 93.5                 |                                                                         |
| 62 to 70,000 pounds.              | 51         | 56        | 63,717                    | 64,452      | - 735       | 63,911                   | 64,900      | - 1,011     | 64,866                    | 64,686      | + 180       | 60.7                       | 76.6                 | 86.0                 |                                                                         |
| Over 70,000 pounds.               | 4          | 9         | 75,450                    | 74,062      | + 1,388     | 70,974                   | 72,130      | - 1,156     | 72,352                    | 72,725      | - 373       | 76.9                       | 92.3                 | 100.0                |                                                                         |
| By chemistry, corrected for size: |            |           |                           |             |             |                          |             |             |                           |             |             |                            |                      |                      |                                                                         |
| 46 to 54,000 pounds.              | 29         | 38        | 52,277                    | 51,778      | + 499       | 52,016                   | 52,049      | - 33        | 52,129                    | 51,931      | + 198       | 79.1                       | 94.0                 | 100.0                | 90.0 per cent. come within 5,000 pounds, being a gain of 16.7 per cent. |
| 54 to 62,000 pounds.              | 101        | 133       | 59,165                    | 58,520      | + 645       | 58,331                   | 58,048      | + 283       | 58,719                    | 58,252      | + 467       | 74.9                       | 90.1                 | 94.4                 |                                                                         |
| 62 to 70,000 pounds.              | 36         | 55        | 64,615                    | 64,407      | + 208       | 64,586                   | 64,398      | + 188       | 65,202                    | 64,703      | + 499       | 68.1                       | 83.5                 | 91.2                 |                                                                         |
| Over 70,000 pounds.               | 5          | 11        | 74,916                    | 73,910      | + 1,006     | 71,622                   | 72,076      | - 454       | 72,653                    | 72,424      | + 229       | 92.3                       | 100.0                | 100.0                |                                                                         |
| By thickness:                     |            |           |                           |             |             |                          |             |             |                           |             |             |                            |                      |                      |                                                                         |
| Under $\frac{3}{8}$ inch.         | 7          | 19        | 65,530                    | 61,921      | + 3,609     | 64,075                   | 61,260      | + 2,815     | 64,466                    | 61,438      | + 3,028     | 26.9                       | 50.0                 | 80.8                 | 90.0 per cent. come within 5,000 pounds, being a gain of 16.7 per cent. |
| $\frac{3}{8}$ and 7-16 inch.      | 48         | 154       | 61,961                    | 61,558      | + 403       | 59,127                   | 58,679      | + 448       | 59,800                    | 59,363      | + 437       | 74.3                       | 87.1                 | 94.1                 |                                                                         |
| $\frac{1}{2}$ and 9-16 inch.      | 54         | 37        | 58,733                    | 59,516      | - 783       | 58,372                   | 58,899      | - 527       | 58,546                    | 59,265      | - 719       | 73.6                       | 92.3                 | 98.9                 |                                                                         |
| $\frac{3}{4}$ to 1 inch.          | 62         | 27        | 57,869                    | 58,848      | - 979       | 61,247                   | 62,090      | - 843       | 58,894                    | 59,832      | - 938       | 73.0                       | 78.7                 | 87.7                 |                                                                         |
| By thickness, corrected for size: |            |           |                           |             |             |                          |             |             |                           |             |             |                            |                      |                      |                                                                         |
| Under $\frac{3}{8}$ inch.         | 7          | 19        | 65,530                    | 64,921      | + 609       | 64,075                   | 64,576      | - 501       | 64,466                    | 61,669      | - 2,083     | 80.8                       | 92.3                 | 92.3                 | 90.0 per cent. come within 5,000 pounds, being a gain of 16.7 per cent. |
| $\frac{3}{8}$ and 7-16 inch.      | 48         | 154       | 61,961                    | 61,350      | + 611       | 59,127                   | 58,821      | + 301       | 59,800                    | 59,422      | + 378       | 73.8                       | 89.1                 | 94.6                 |                                                                         |
| $\frac{1}{2}$ and 9-16 inch.      | 54         | 37        | 58,733                    | 58,484      | + 249       | 58,372                   | 57,989      | + 473       | 58,586                    | 58,246      | + 340       | 81.3                       | 92.3                 | 98.9                 |                                                                         |
| $\frac{3}{4}$ to 1 inch.          | 62         | 27        | 57,869                    | 57,086      | + 783       | 61,247                   | 60,479      | + 768       | 58,894                    | 58,116      | + 778       | 68.5                       | 88.8                 | 92.1                 |                                                                         |
| All tests.....                    | 171        | 237       | 59,004                    | 59,946      | - 942       | 59,648                   | 59,309      | + 339       | 59,629                    | 59,576      | + 53        | 70.8                       | 84.1                 | 92.9                 |                                                                         |
| All tests corrected for size.     | 171        | 237       | 59,004                    | 59,045      | + 559       | 59,648                   | 59,327      | + 321       | 59,639                    | 59,309      | + 420       | 74.7                       | 89.7                 | 94.9                 |                                                                         |

not as accurate for high steels as for the low, although after making corrections for size of plates the results are materially improved. But in order to settle this matter the tests were grouped by their calculated ultimates, and the results then show that the table is just as accurate for high steel as low.

The practical application of the table of estimated ultimate strengths in the manufacture of steel at the works of the Pottstown Iron Company has given very satisfactory results. Out of the last 1000 blows graded in this way 98 per cent. of them met the requirements in every respect and were accepted. Having the same standard of comparison in use in all departments gives a close check on each step in the process of manufacture, and has enabled the company to greatly improve the quality and uniformity of the finished product. If a blow does not give the results as indicated by its chemistry, it is followed back through each process of manufacture, and if the cause of the trouble is not made apparent a complete analysis is then made of the drillings from broken test pieces. This generally locates the trouble. When rolling heavy steel plates trouble is often caused by finishing them at too high a temperature, which gives a material with crystalline fracture, poor reduction and poor bends. In order to guard against this and control the finishing temperature, we use very light drafts in rolling and produce as good results in heavy plates as light ones.

In figuring over the well known series of tests of steel plates published by Mr. Salom, Mr. Webster finds that the tensile strength ascertained by Mr. Salom came within 3000 pounds of that calculated by Mr. Webster's method in 71.9 per cent. of the tests. It came within 4000 pounds in 80.9 per cent. of the tests and within 5000 pounds in 88.4 per cent. of the tests. The following table shows the percentages arranged according to the range of the different elements:

|                                           | Number of tests. | Per cent. within 3,000 pounds. | Per cent. within 4,000 pounds. | Per cent. within 5,000 pounds. |
|-------------------------------------------|------------------|--------------------------------|--------------------------------|--------------------------------|
| Carbon, 0.11 to 0.15, inclusive .....     | 113              | 69.0                           | 78.8                           | 85.8                           |
| Carbon, 0.16 to 0.20, inclusive .....     | 86               | 75.6                           | 83.7                           | 91.9                           |
| Phosphorus, 0.03 to 0.05, inclusive ..... | 108              | 68.5                           | 76.8                           | 84.3                           |
| Phosphorus, 0.06 to 0.08, inclusive ..... | 91               | 75.8                           | 85.7                           | 93.4                           |
| Manganese, 0.25 to 0.37, inclusive .....  | 100              | 87.0                           | 83.0                           | 90.0                           |
| Manganese, 0.38 to 0.50, inclusive .....  | 49               | 76.7                           | 78.7                           | 86.8                           |
| All tests .....                           | 199              | 71.9                           | 80.9                           | 88.4                           |

In investigating Mr. Gatewood's well known series the following results were obtained:

|                                           | Number of tests. | Per cent. within 3,000 pounds. | Per cent. within 4,000 pounds. | Per cent. within 5,000 pounds. |
|-------------------------------------------|------------------|--------------------------------|--------------------------------|--------------------------------|
| Carbon, 0.11 to 0.15, inclusive .....     | 59               | 71.6                           | 83.1                           | 91.5                           |
| Carbon, 0.16 to 0.20, inclusive .....     | 39               | 76.9                           | 84.6                           | 94.4                           |
| Phosphorus, 0.13 to 0.05, inclusive ..... | 51               | 72.2                           | 80.4                           | 90.2                           |
| Phosphorus, 0.06 to 0.08, inclusive ..... | 47               | 74.5                           | 87.2                           | 95.7                           |
| Manganese, 0.25 to 0.37, inclusive .....  | 50               | 72.0                           | 84.0                           | 96.0                           |
| Manganese, 0.38 to 0.50, inclusive .....  | 48               | 75.0                           | 83.3                           | 89.6                           |
| All tests .....                           | 98               | 73.5                           | 83.7                           | 92.9                           |

An examination of a series of tests, with accompanying analyses, of Well-

man steel, published in *The Iron Age*, brought out the following results:

|                                                | Number of tests. | Per cent. within 3,000 pounds. | Per cent. within 4,000 pounds. | Per cent. within 5,000 pounds. |
|------------------------------------------------|------------------|--------------------------------|--------------------------------|--------------------------------|
| Carbon, 0.10 to 0.15, inclusive .....          | 31               | 76.1                           | 87.1                           | 98.8                           |
| Carbon, 0.16 to 0.20, inclusive .....          | 24               | 83.3                           | 91.6                           | 100.0                          |
| Phosphorus, under 0.02, inclusive .....        | 35               | 87.8                           | 100.0                          | 100.0                          |
| Phosphorus, over 0.02 to 0.04, inclusive ..... | 22               | 83.6                           | 72.7                           | 95.4                           |
| Manganese, 0.37 to 0.45, inclusive .....       | 18               | 77.7                           | 88.8                           | 94.4                           |
| Manganese, 0.46 to 0.53, inclusive .....       | 37               | 78.4                           | 89.2                           | 100.0                          |
| All tests .....                                | 55               | 76.4                           | 89.1                           | 98.2                           |

In order to prove that his methods apply equally well to open hearth acid and basic steel as to Bessemer acid and basic steel, Mr. Webster has submitted additional series, which it would take too much space to present. He has also figured in an interesting manner over the data presented in a paper on "Segregation" by M. Alexandre Pourcel.

Mr. Webster communicates also an important letter from A. Lantz of the Peine Works, Germany, in which that gentleman states that they have found that oxygen plays an important part not hitherto noted. With like contents of carbon, phosphorus and manganese in the blows, the blow with higher oxygen contents yields metal of greater hardness and less ductility. Other conditions being similar, variations in oxygen contents bring about differences of several kilograms per square millimeter in the tensile strength.

Capt. A. E. Hunt of Pittsburgh alluded to the use of aluminum in preventing segregation. From  $\frac{1}{4}$  to  $\frac{1}{2}$  pound of the metal added to large steel castings produces a uniform product. He held that the explanation of this effect lies in the circumstance that the metal is made to solidify more uniformly as to time.

John M. Cabot of the Maryland Steel Company, Sparrow's Point, Md., inclined to the belief that the effect of

the ingots into the heating furnace offers an explanation for inferior rolling

quality often erroneously ascribed to casting temperature.

Jos. Hartshorne of the Pottstown Iron Company, Pottstown, Pa., in reference to reducing segregation, insisted that the safest means was to keep the impurities so low that when it does happen segregation will not produce disastrous effects. Mr. Hartshorne held that the casting temperature does have an immense effect upon the rolling quality of steel. Its influence goes very near to the final product in its effect upon the physical quality of the steel. The well known Pottstown tests have been applied to the same steels in the 4-inch trial ingot, reduced ten times, forged to  $1\frac{1}{2}$  inch, and to steel cut from the bloom after a reduction of 230, and revealed the same characteristics in spite of greatly increased work. The metal from a hot heat is more brittle. The fracture of steel poured too hot is the same, in its general features, as steel which has been finished at too high a temperature or taken out of the heating furnace too hot. It is an open question whether the characteristics produced by a hot casting temperature are due to molecular changes produced thereby or to the presence of occluded oxygen or of oxide of iron. In the basic Bessemer process, at least, a hot blow means a longer blow, and therefore increased oxidation. It is an open question whether high temperature or the phenomena which go with high temperature produce the persistent effects upon rolling quality referred to.

President Howe questioned whether rapid cooling does prevent segregation. He suggested that the impression that it does may have been produced by the fact that it is more readily noticeable in larger ingots but is not so easily traced in smaller ones. He suggested that it does not follow that slower cooling aids segregation, since it is the injurious elements which concentrate through segregation. Dr. Howe suggested that it might be well to encourage it in large ingots, with a view to subsequent removal. If segregation raises the accumulation of injurious substances to the top of the ingots they could be removed by shearing off. Dr. Howe also discussed recent developments in pyrometers, and offered suggestions.

The session on Friday morning was opened by the announcement of the result of the annual election, as follows:

- President: John Fritz, Bethlehem, Pa.  
Vice-presidents: J. T. Holloway, New York; J. C. Platt, Waterford, Conn.; E. V. D'Inivilliers, Philadelphia.  
Managers: T. A. Rickard, Denver, Col.; H. O. Hofman, Boston; John A. Church, New York.  
Treasurer: T. D. Rand, Philadelphia.  
Secretary: Dr. R. W. Raymond, New York.

The annual report of the Council was then read.

The principal paper of the session was that of Dr. Leonard Waldo of Bridgeport, Conn., on "Aluminum Bronze," which attracted a good deal of attention and was discussed at some length. We shall have occasion to print it in an early issue.

The session was closed with the following paper by James E. Howard of the Watertown Arsenal:

**Notes on Some Tests by Repeated Stresses Made at the Watertown Arsenal, Mass.**

A series of experiments on repeated stresses by transverse loads on rotating shafts was begun at the Watertown Arsenal during the year 1888, and has continued since that time, the tests still being in progress. Shafts 1 inch diameter are employed, supported at the ends, 33 inches apart, and exposed to a load, either on one central bearing or on two bearings 4 inches apart. The latter method of loading is used to obtain a section at the middle of the length of the shaft uniformly loaded of sufficient length for subsequent examination by direct tensile test. The material experimented upon has been steels ranging in carbon from 0.15 per cent. to 1.10 per cent., hot rolled metal, also cold rolled steel, wrought iron and cast iron. The speed of rotation has generally been maintained at 400 per minute, with some tests at higher speeds, 2200 per minute having been the maximum thus far reached, with the intention, however, of experimenting with steels up to 22,000 per minute, or higher if found practicable to attain.

It will not be so much the object of this paper to state specific results as it will be to invite attention to the manner of carrying on the investigation; in fact, any attempt to draw extended deductions would at this time be premature. The total number of rotations or repetitions of stresses which the shafts will endure under different fiber stresses before rupture is in most cases determined, but a vigorous effort is being made to ascertain what phases the material passes through prior to complete rupture.

It is desired to ascertain of what deterioration consists as illustrated in the physical properties and whether the progress of deterioration may be arrested and a restoration effected and by what means, defining at what stages, if any, such restoration is possible. We observe that a load of one-half of the tensile elastic limit and less than one-third its tensile strength will in a comparatively short time, by means of repeated stresses, rupture one of these rotating shafts.

Considering now the usual effect of cold working, such as cold rolling and wire drawing, and an elevation in tensile strength is the result. While there is dissimilarity of treatment in these cases, still the results raise the query whether metals of the classes experimented upon do not have a tendency to pass through a state of maximum cohesive resistance and whether final rupture occurs under real or apparently diminished stresses. It sometimes promotes an investigation to indulge in certain hypotheses and then direct our efforts to learn what are facts.

Being familiar with the fact that certain cold working introduces changes in density and internal strains and that internal strains reach a state of intensity or concentration of action nearly or quite sufficient to cause rupture in a

metal of exhausted toughness, and, furthermore, that alternate stresses tend to exhaust the toughness; with these facts before us, we can hardly assume that it has yet been shown that the cohesive resistance between adjacent particles of steel does not go on increasing under the influence of cold working until the moment of final rupture. To assist in the solution of questions of this nature, fundamental in the use of metals under prolonged stresses, certain of the experimental shafts will be examined after having performed a less number of rotations than required to produce complete rupture. Annular specimens will be taken from the middle of the length of the shafts and tested by tension in the direction of the axis of the shaft. The object of employing annular specimens is, of course, to remove the metal nearest the neutral axis of the shaft and test that part only which has been exposed to the higher stresses.

The investigation has not advanced far enough to speak with confidence upon the results at present obtained, but in one instance there was extraordinary gain in strength over the primitive strength of the metal as displayed in an annular specimen from an overloaded shaft, and unless this can be explained in some other manner it would appear to indicate that the course representing the tensile strength of the metal in question was not a straight line from its primitive condition to that of final rupture by repeated stresses, considering now the apparent behavior of the rotating shafts.

In the series of tests under discussion shafts will be run under different fiber stresses, and after establishing the number of loadings necessary to produce rupture with each fiber stress other shafts will be run a less number of rotations, specimens taken out and tested. Some of the specimens thus taken out will be annealed before testing by tension. In this manner it is expected valuable information will be reached. Most tests of the series have been carried on at ordinary atmospheric temperatures; at least, the shafts have not been allowed to acquire a very high temperature. A number of shafts, however, have been allowed under the influence of a high fiber stress to attain a temperature of nearly 400° F., and perhaps this temperature may have been exceeded. Several shafts acquired a blue heat. At this higher temperature the shafts endured from four to ten times the number of rotations before rupture over the duplicate shafts run at temperatures ranging from 70° to 110° F.

This most extraordinary behavior of the hot shafts will be fully investigated. At present there is no reason for believing these results to be exceptional, startling as they may appear. In the zone of temperature between 400° and 600° F. the highest tensile strength is found, but at this time the elastic limits show a decrease over the values found at ordinary temperatures. The modulus of elasticity at 400° F. is doubtless lower than at 70° F., showing a greater mobility of the metal within the elastic limit at the higher temperature. The shafts on which these remarks are based concerning the superior endurance when hot were loaded with a high fiber stress; tests to follow will be made with lower stresses.

The criticism may be made that all of the tests of this series have been made with higher fiber stresses than would be employed in the ordinary service of the metal, and that not the same comparative results would be

found under different conditions of loading.

The relation which the elastic limit and the toughness displayed in a tensile test bear to the endurance of the metal under repeated alternate stresses has not yet been made apparent in these tests. As before mentioned, shafts have been ruptured with stresses one-half the tensile elastic limit and metal which will elongate 20 per cent. in a tensile specimen is ruptured with almost inappreciable elongation in the rotating shaft. It may be remarked in passing that the jog in the tensile curve often displayed soon after the elastic limit is passed is eliminated by first overstraining the metal in compression.

Shafts which show small or no measurable permanent sets in deflection when first loaded often display appreciable sets after having been run a few hundred or thousand rotations. An interval of rest commonly diminishes the sets, which appear when the test is resumed, but the gain in this respect is soon lost after a few additional rotations.

When a high fiber stress is first applied, one which would cause a very decided permanent set, the power required to rotate the experimental shaft is greater than subsequently needed after a few hundred rotations have been made.

The deflection of the shaft is not affected by the speed of rotation when the fiber stress does not cause sensible permanent sets—i. e., within the limits of these experiments which have embraced a speed of 2200 rotations per minute and fiber stresses of 50,000 pounds per square inch in combination. When, however, the fiber stress exceeds the elastic limit of the metal the deflections are diminished, the shaft in the meantime rapidly acquiring a higher temperature, under a high speed of rotation.

A cast (gun) iron bar displayed remarkable endurance while under a maximum fiber stress of 15,000 pounds per square inch. This shaft ruptured at 47,285,500 rotations, and yet at each rotation there was doubtless developed a measurable permanent set in the metal. Making a comparison of endurance according to the magnitude of the permanent sets developed at each rotation, this bar exceeded any steel bar experimented with. Final rupture is commonly accompanied by a wobbling motion of the shaft, as fractures rarely penetrate the metal around the entire circumference. After the first indications of impending rupture the fracture is completed within a few hundred rotations.

In the afternoon a visit was paid to the Portsmouth Navy Yard, while on Saturday a considerable number of the party made a trip into the Dismal Swamp.

The Lake Superior Mining Institute will hold its second annual meeting at Houghton, Mich., beginning Wednesday, March 7, 1894, and lasting for three days. The programme of the meeting includes the presentation of papers by Prof. F. F. Sharpless, Capt. Wm. Bond, J. Parke Channing, Dr. L. L. Hubbard and H. V. Winchell, an inspection of the Michigan Mining School at East Houghton and visits to points of interest in the neighborhood.

Immigration is now more marked in the Southern States than at any period since the war.



## Machine for Making Crank Shafts

A difficulty heretofore experienced in machines of this description has been in the stretching of the rod during the operation of bending, so as to leave insufficient metal in the crank pin and arms of the crank when completed. The designers of the machine herewith illustrated (Edmund Thomas and Thomas L. Fitzgerald of Erie, Pa.) state that this is overcome in the following way: The heated rod is first bent around a central die, which can be moved forward or back as desired, according to the throw of the crank to be made; during this part of the operation the central die is set forward so that the arms of the crank are bent somewhat longer than it is desired to have them

In the drawings Fig. 1 is a plan view as the machine appears with a rod ready to be bent; Fig. 2 is a like view during the operation of upsetting the metal in the arms of the crank, and Fig. 3 shows the finishing step in making the crank. The inside faces of the side frames A are provided with ways in which the edges of the table C fit. The hydraulic cylinders D are secured to the side frames. On these cylinders are the studs E, upon which are pivoted arms E', which are provided with friction rollers operating between the ends of the dies F and the shaft G during the first step in making the crank. These arms serve to guide the rollers during the bending of the shaft into the shape illustrated in Fig. 2, after which the dies F are moved back and the arms E' lifted from the studs and laid aside.

Through the center of the block is an opening through which the stem of a wrist pin die, M, moves longitudinally and on the face of the block and projecting longitudinally from it above and below the opening are guides and between which the wrist pin die travels. The inner face of the dies F are also provided with longitudinal recesses within which the ends of the wrist pin die slide longitudinally, and which also operate as dies for forming up the sides of the crank; semicircular recesses are also formed in the ends of the dies F corresponding with the recesses in the dies J.

The outward movement of the dies F is limited by a strap secured to the dies by bolts.

In making a crank, the rod G is first heated to the proper temperature, at

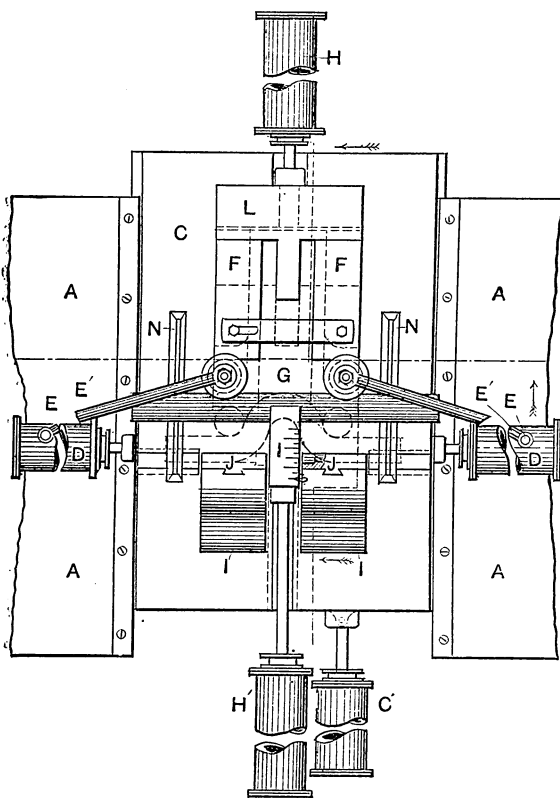


Fig. 1.—Plan View.—First Operation.

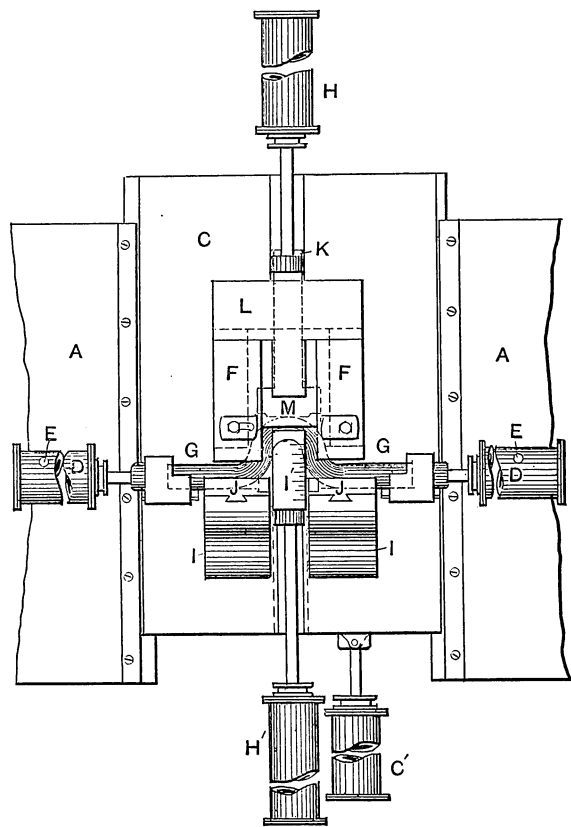


Fig. 2.—Plan View.—Upsetting the Arms.

## MACHINE FOR MAKING CRANK SHAFTS.

when the crank is finished. After the first bend is made the central die is set back until it only projects a distance equal to the length it is desired to make the finished crank arms. Hydraulic pistons for producing pressure are then applied to the ends of the rod so as to force it toward the central die, and at the same time a wrist pin die is brought down upon the portion of the crank designed for the wrist pin so as to force it downward upon the end of the central die, which steps operate to upset the arms of the crank and at the same time shorten the bends at the points where the crank arms start out from the rod. Laterally movable side dies are then brought down upon the rod at the sides of the arms of the partially finished crank and hydraulic pressure applied both laterally and longitudinally, which acts to compress the surplus metal forced into the crank arms by the upsetting process into the dies so as to square out the corners of the arms.

At each end of the sliding table are hydraulic cylinders, H H', arranged as shown. At one end of the table is another hydraulic cylinder, C', by which the table is moved and held in any desired position. On one end of the table are upright projections, I, between which a central die, I', is operated by means of the lower piston. In dovetailed grooves in the ends of these projections are held dies, J, having circular recesses in their faces to receive the rod and form up a portion of the bends of the crank. These dies may be removed and others substituted according to the size of shaft used. In the opposite end of the table C is a longitudinal dovetail slot, K, in which a dovetail rib on a transverse block, L, moves longitudinally. In the face of this block is a dovetail groove in which projections on the ends of the dies F fit, so that the dies F will move transversely to and from each other therein and at the same time move longitudinally in unison with the block L.

the point where it is desired to make the crank, and then laid upon the rests N N in front of the central die I'. The friction rollers are then placed in position and the dies F are moved forward until the rod is bent into the shape illustrated in Fig. 2. The dies F are then moved back and the friction rollers removed; the central die I' is then moved back to the proper distance for the length of the crank to be made, and the wrist pin die M placed in position and the dies F moved forward to approximately the position illustrated in Fig. 2. Pressure is then simultaneously applied to the wrist pin die M and to the ends of the rod G, which operate to compress the bends in the rod or shaft against the central die I' and at the same time upset the arms of the crank the amount required. The table C is then moved so that the piston rods of the cylinders E will contact with the sides of the dies F, which are then forced together and endwise by the pis-

ton rod of cylinder H until they contact with the sides of the central die I' and with the faces of dies J, the commencement of this feature of the process being illustrated in Fig. 3.

### Some Points About Heating Furnaces.

BY G. SIEURIN, WAUKEGAN, ILL.

The literature on heating furnaces in this country seems to be altogether too limited in both amount and real scientific worth in comparison with what is written about boilers and engines, &c. The reasons the writer does not claim to be able to tell, but he believes that one of the chief reasons is to be found in the fact that exhaustive scientifically

Let us take as an example a billet heating furnace in which the billets are pushed in at the back end by a hydraulic pusher or otherwise and a conveyor of some sort receives the heated billets at the other or front end. This arrangement is no doubt much ahead of the old way, when each billet was put in by a man and then had to be rolled over for quite a distance until it finally was hot enough to be taken out. But the method of charging the furnace mechanically has led the writer to believe that there is a field open for more work in the same direction and he hopes that the following general hints may be of some value to all interested.

The ideal heating furnace for billets, say 4 inches square by 3 or 4 feet long, in the writer's opinion, would be one in which the heated billet, by some mechanical device, is pulled out and

duty being mainly to spread the billets apart before they approach a welding heat and to place the last and properly heated billet where it will be taken care of by the mechanical discharger. Having once set the blast right, it ought to require very little attention except in case of shutting down and starting up.

A furnace constructed on these principles ought to be very easy to test and the effects be easily traced which are produced by certain changes either in its construction, as, *e. g.*, widening out or closing up of parts, or by letting on more blast or giving it a different temperature. The results of such tests will then form a reliable basis upon which to construct furnaces, which will save a very large percentage of the present coal consumption. The latter, in comparison with that of boilers, probably is enormous.

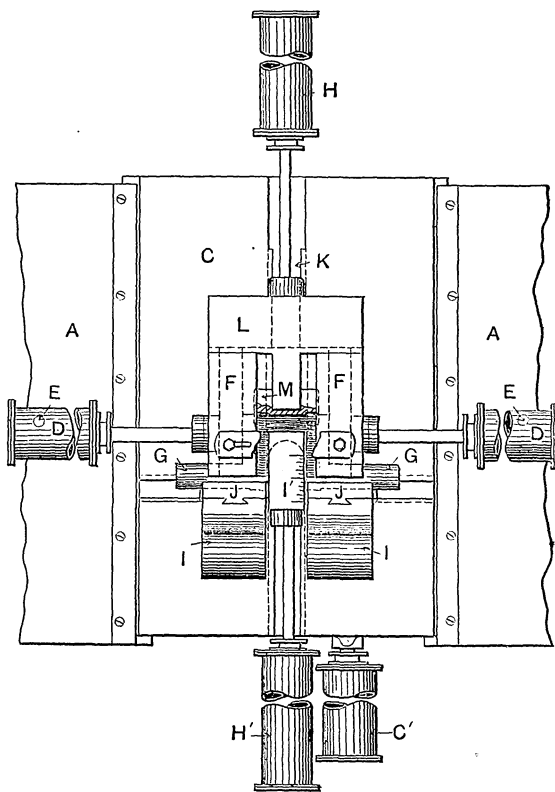


Fig. 3.—Plan View.—Last Operation.

### MACHINE FOR MAKING CRANK SHAFTS.

conducted tests on the workings of furnaces are very rarely made, and if made the results are generally not published.

In firing boilers the rule is to employ cheap men who give no thought to the economy of coal. With furnaces of all kinds, including those in which iron is heated for a rolling mill, this is also true. The only guide for the boiler fireman are the steam and water gauges; for the heater it is and ought to be the color of the metal only. In other words, the amount and temperature of the blast, the area of grate, the depth of fire box, position of blast for combustion, amount of steam blast if any, size of flues, inside width, height and length of furnace; thickness of walls and arches, size and positions of necessary openings, position of slag hole; all these things should be so proportioned and arranged for a special furnace that it will yield the largest output of heated iron per ton of coal, providing the heater attends to the correct heat of the metal.

dumped on the conveyor through a small opening, which should not be kept open any longer than is actually necessary. This mechanical device should be connected with a charger at the back end, so that when one billet is taken out another should go in. There should also be a uniform feed of coal into the fire box.

If a set of several furnaces is used, which is generally the case, the mechanisms for charging and discharging the billets should be connected, so that there would be exactly equal intervals between each billet for each furnace and also equal intervals between each billet arriving at the rolling mill, thus securing the most uniform work in the mills and furnaces. Of course, there should be means whereby the charging and discharging of billets could be instantly stopped, and the feeding in of coal should be modified as soon as there is a stoppage at the rolling mill.

By a uniform running of the furnace the work and worry of the heaters would be reduced to a minimum, their

**Immigration Statistics.**—During the year ending June 30, 1893, 502,917 immigrants of all nationalities entered the United States, a decrease of 120,167 from the preceding fiscal year. Europe sent over 488,832; Asia, 6999; the West Indies, 3159; Oceania, 2665; South America, 610, and Africa, 327. Considered according to nationality, Germany continues to send the largest number of immigrants, having contributed during the last fiscal year 96,361; Italy comes next with 71,145; Ireland, with 49,233, and England, with 46,501, the total for the United Kingdom being 109,086. Russia decreased her population by sending us 37,177 of her people, and Austria Hungary furnished 59,633. Compared with last year, the falling off was over 50 per cent. for Russia; Germany, Italy, Ireland and England also furnished a much smaller number of immigrants, while the figure for Poland fell from 83,299 for 1892 to 13,664 for 1893. Of the total of 502,917 immigrants arriving on these shores during the 12 months, 47,631 were classed as skilled; 2600 professional, and 201,340 miscellaneous, while 250,512 were without occupation. In the professional list, 631 were musicians, 318 teachers, 281 artists, 187 sculptors, 177 actors, and 31 civil engineers. Among those classified as skilled were 4691 carpenters and joiners, 4474 miners, 3808 tailors, 3201 clerks, 3075 shoemakers, 2249 weavers, 2073 blacksmiths, 1617 accountants, bookkeepers and cashiers, 1412 engineers, 1117 machinists, 452 iron workers and 79 iron molders. Germany and the United Kingdom, of course, contributed the largest share of the professional and skilled class. About 80 per cent. of the total immigration, or 404,337, landed in New York harbor, while 29,583 entered Boston, 28,906 entered Philadelphia, and 2683 landed at Baltimore. The Commissioner of the Bureau of Immigration has endeavored to collect data showing the destination of arriving immigrants. His statement shows that 161,047 intended to remain in New York; 57,083 expected to settle in Pennsylvania; 46,686 in Illinois; 35,531 in Massachusetts; 15,150 in New Jersey; 12,127 in Ohio, and 12,034 in Wisconsin. The New South appears to have been thought an unprofitable field, since Alabama, Georgia, North and South Carolina, Tennessee, Virginia and West Virginia together only received 3095 new inhabitants in this manner. Of the total immigration 315,845 were males; of these 30,500 were under 15 years of age, 267,389 were 15 and under 40 years of age, and the remainder over 40 years. The arrivals

from the British North American possessions and Mexico are not included in the figures given above. In 1891 the arrivals at Canadian ports from European countries *en route* to the United States numbered 105,213.

#### Inspection of Iron and Steel Plate.

James A. Dumont, Supervising Inspector-General, has issued the following circular, under date of February 6:

Your attention is invited to the following regulations for carrying into effect the act of Congress approved January 22, 1894, amending section 4430, title 52, of the Revised Statutes of the United States, relative to inspection of iron or steel boiler plates, by adding thereto a paragraph as follows:

"And the Supervising Inspector-General may, under the direction of the Secretary of the Treasury, detail assistant inspectors from any local inspection district where assistant inspectors are employed, to inspect iron or steel boiler plates at the mills where the same are manufactured; and if the plates are found in accordance with the rules of the supervising inspectors, the assistant inspector shall stamp the same with the initials of his name, followed by the letters and words, 'U. S. Assistant Inspector;' and material so stamped shall be accepted by the local inspectors in the districts where such material is to be manufactured into marine boilers as being in full compliance with the requirements of this section regarding the inspection of boiler plates; it being further provided that any person who affixes any false, forged, fraudulent, spurious, or counterfeit of the stamp herein authorized to be put on by an assistant inspector shall be deemed guilty of a felony, and shall be fined not less than \$1000, nor more than \$5000, and imprisoned not less than two years nor more than five years."

Manufacturers of boiler plate, steel or iron, requiring the services of an assistant inspector, under the provisions of the act quoted, to test boiler plate at the mills where manufactured, must make application to the Supervising Inspector-General direct by mail or telegram, stating, when applications are by mail, the number of plates to be tested, the name and address of the boiler manufacturer, the local inspection district in which such manufactory is located, accompanied with a duplicate of the boiler manufacturer's order containing size and description of plates required, tensile strength, &c. When application is made by telegram, the details described must be furnished the assistant inspector who may be detailed to make the required tests previous to such tests being made.

Coupons for testing, unless cut off in the presence of the assistant inspector, must be stamped with the manufacturer's stamp at each end of the coupon in such manner that one-half of such stamp shall show on the coupon at the line of shearing or planing, the other half on the plate on same line in such manner that the assistant inspector may, by matching the coupon to the plate, determine to his satisfaction that the coupon is actually from the plate he is to test. In districts having assistant inspectors, where mills are located in the immediate vicinity of the inspector's office—say within 10 miles—the assistant inspector may test as small lots as may be required. When at a greater distance, however, an assistant inspector

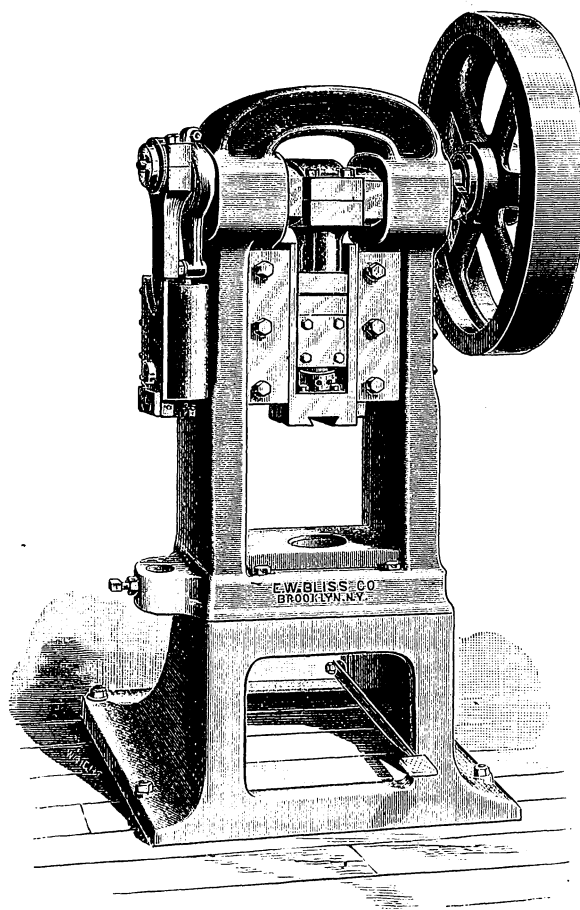
will not be sent to inspect lots of less than three plates. In cases of lots of three or less plates the material will have to be tested as formerly—namely, by the supervising or local inspector in the district where the plate is to be used.

Assistant inspectors detailed to test material at the mills will, after making the required tests, place thereon the stamps required by the act referred to herein, one of such stamps to be placed over each of the manufacturer's stamps on such plate, required by section 1, rule I, Rules and Regulations—namely: "At the diagonal corners of each plate, at a distance of about 4 inches from the edges, and at or near the center of the plate." In addition to which they shall stamp a number under their initials on such plates, so that each plate shall be numbered in numerical succession, for

stated, cost about \$750,000 to erect. Work will be commenced on the building about May 1.

#### Trimming Press for Drop Forgings.

The engraving represents a press of new design built by the E. W. Bliss Company of 17 Adams street, Brooklyn, and is intended for use in the forge shops where hot metal is to be trimmed. It is provided with the Bliss clutch and a patented adjustment in the slide, and has a supplementary slide in the side of its frame to be used in cutting off the work from the bar after it has been forged and trimmed. The press is of ample strength in all its parts and is usually provided with a fly wheel, as it



TRIMMING PRESS FOR DROP FORGINGS.

record, commencing with number 1, the numerical order to be continued in all future lots they may test, so that no one assistant inspector's tests shall show duplicate numbered plates.

The Pennsylvania Railroad Company have purchased the Washington Hotel property at the northeast corner of Madison and Canal streets, Chicago, and will obtain possession of the premises on May 1. It is stated on reliable authority that the company design erecting a large and handsome general office building on this site, and that negotiations are in progress for the Norton mill property adjoining on the east. Should this be acquired the company will construct a mammoth building extending from the river to Canal street, with connecting arches over the railroad tracks. The building will be an imposing structure and will, it is

generally necessary to trim forgings very quickly and a high speed machine is essential. The machine shown has a 4-inch stroke, 4 inch adjustment; bed is 15 inches from bed to end of slide when up; distance between uprights is 22 inches. This machine carries a 900-pound fly wheel, the total weight being about 5500 pounds. The dimensions can be modified to suit special requirements if necessary. These presses can also be geared for cold trimming.

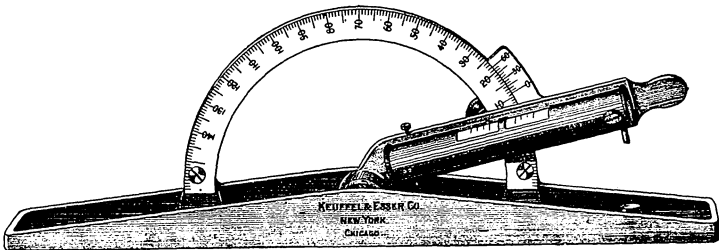
H. F. J. Porter, who was first assistant mechanical engineer at the late Columbian Exposition during its period of construction and afterward assistant chief of the machinery department, has formed a partnership with Albert Fisher, formerly Chicago representative of the Ball, Watertown and Green engine companies, and together they have opened an office at 1025 Monadnock

Block, Chicago, where, under the name of Fisher & Porter, they will carry on a contracting engineering business in the line of complete equipment of steam plants, giving especial attention to large work. They have been made Western representatives of the Providence Steam Engine Company, sole builders of the improved Green engine, and of the Altoona Mfg. Company, builders of the M. A. Green engine. Thus handling engines of the very highest grade of both the slow and high speed types they are prepared to meet any demand for first-class work in that direction.

and J. C. Colgate, these latter two representing the Rockefeller syndicate. The officers are : Colgate Hoyt, president; Joseph L. Colby, first vice-president; C. W. Whitmore, second vice-president; R. C. Whitmore, secretary; Alexander McDougall, general manager.

Woven Wire and Graphite Commutator Brush.

The Belknap Motor Company of Portland, Maine, are making a commutator



COMBINED LEVEL AND CLINOMETER.

They are making arrangements with other Eastern manufacturers as agents, and expect to be ready in other lines to take advantage of the incoming tide of business.

Combined Level and Clinometer.

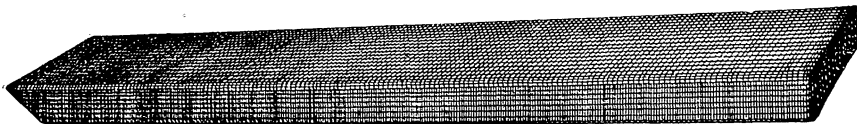
The Keuffel & Esser Company of 127 Fulton street, New York, make an instrument, which we illustrate, designed for use by machinists, civil engineers, architects, builders and others. The combined level and clinometer can be applied directly, when mounting machinery, construction material, &c., or it can be used on a straightedge (or measuring rod) to determine the natural slope of the ground, the slope of embankments or excavations, in laying rails, &c. It consists of a bronze base 9 inches in length, which carries a silvered arc 4 1/2 inches in diameter, graduated to degrees, and a vernier reading to 5 minutes. There is an adjustable graduated bubble provided with clamp screw, and provision is made for taking up lost motion in the joint of the arm carrying the bubble. The method of using the instrument is as follows:

When the instrument is placed on the object to be measured, or on the interposed straight object, the bubble tube is moved, by means of the handle on it, until the bubble stands at the center of the tube. The arc and vernier will then read zero if the object be horizontal, or they will indicate in degrees and minutes the amount of slope.

A Baltimore dispatch states that the Baltimore Iron, Steel & Tin Plate Company of that city have secured control of the rolling mill and tin plate works of Coates & Co., at Locust Point, and will reopen them next week. Instead of simply dipping the plates, as has been done heretofore, the company will roll black sheets, and use these in the manufacture of their tin plates.

The American Steel Barge Company of West Superior, Wis., builders of whaleback vessels, held their annual meeting on the 14th inst. The old board of directors were elected, except Messrs. Whitmore and Bartlett, whose places were filled by Frank Rockefeller

brush composed of woven wire and graphite. It is made of pure copper wire cloth of a special weave put together in such a way that while it has great flexibility it holds its shape permanently. The inside folds of the wire cloth are treated with a compound of graphite so that as the brush wears the graphite furnishes the lubrication for the commutator. This brush has the advantages of the ordinary copper brushes and carbon brushes, since it possesses the required conductivity, and at the same time is very easy on the commutator. While the carbon brush has been used because it is less injurious to the commutator, its great resistance as compared with copper is disadvantageous. It is stated that the brush illustrated requires no grinding or fitting to the commutator, and that the stubs of worn



WOVEN WIRE AND GRAPHITE COMMUTATOR BRUSH.

out brushes need not be thrown away, as they can be worked into the centers of new brushes.

Wire Drawers' Wages.

A strike in a Western wire mill has brought out the following statement relative to wages by one of the workmen:

The wire drawers on strike are those who worked on wire the gauge of which ranged from 20 1/4 to 33. A wire known as the 33-gauge is 0.011 inch in diameter. A man working on wire the gauge of which runs from 20 1/4 to 26 can on an average turn out 250 pounds per day, and a wire drawer who runs the wire through the gauges from 20 1/4 to 33 can make about 175 pounds per day. The rate paid by the company per 100 pounds has been as follows:

| Gauge.            | Rate before Aug., 1893. | Rate Aug., 1893. | Rate Feb. 1, 1894. |
|-------------------|-------------------------|------------------|--------------------|
| 20 1/4 to 33..... | \$1.57                  | \$1.37           | \$0.95             |
| 20 1/4 to 26..... | .57                     | .46              | .30                |

With regard to the cut proposed on February 1 we were told that the rate would not be more than 30 and 95 cents for the two kinds of work. It may be less. In figuring up the amount that may be earned by a man you must deduct the amount he is required to pay for scrap or waste wire and "shorts," which are also waste. The "shorts" are odd pieces of wire which are caused by breaking while being run on the spindles, and the scrap is the waste that does not become commercial wire. We are allowed 2 1/2 pounds of scrap per day, but a man cannot help making 5 or 6 pounds. For all over 2 1/2 pounds the company charge us 10 cents per pound. The perfect wire is sold by the company for from 5 1/2 cents to 6 cents per pound. All the "shorts" cost us 10 cents per pound. Part of them are commercial wire, and the company convert the others into what is sold for from 1 cent to 2 cents per pound. The scrap and "shorts" cost a man about 40 cents per day. The cut last August was 12 1/2 per cent., and this second reduction is over 30 per cent.

The Canadian Pig Iron Trade.

A correspondent of the Montreal Gazette, who writes over the signature "Importer," gives the following data:

Taking the present price of No. 1 Summerlee, which is the favorite brand here, at 53 shillings, this is equivalent to \$12.89 per ton, and this is without doubt the iron that competes most with Canadian brands in Montreal and the East. Ask the Londonderry company and the Ferrona company and they will tell you that they hear little or nothing about competition with Scotch warrant iron.

Summerlee would cost at present freights over \$20 to deliver in Montreal, but at summer freights of say 4 shillings 6 pence it would cost at least \$18.50. I used to sell this iron in thousands of tons where I now sell it in hundreds only. The reason is simply

that Londonderry and Ferrona are selling at \$16 to \$17 and take its place. It would be well also to note that while the freight from Glasgow to Montreal in summer is only about \$1.10, as stated in the Herald, the freight from the Nova Scotia furnaces is about \$3.50. In Western Canada Scotch pig iron is practically "out of the running," as American during the past two or three years has been the only competitor of Canadian iron. During the past year the Americans have simply made their prices to suit the market, irrespective of cost. This state of affairs would not continue under improved business conditions in the United States, as there is no doubt some American furnaces are losing money on every ton they make.

Referring to the article in the Witness of Saturday under the heading of "A Troubled Organ," the curious statement is made that the duties on pig iron and cast scrap collected in 1891 and 1892 were \$385,041 on 204,000 tons from Great Britain, and \$206,240 on 102,000 tons from the United States.

The figures for the fiscal year ending June 30, 1892, as they appear in the table in the *Star* were: Total imports of pig iron from all countries, 68,918 tons, of which 25,110 tons came from the United States. I am afraid the returns for the fiscal year ending June 30, 1893, will show a considerable increase in the imports from the United States and a very large decrease in those from Great Britain. I would like very much to see this state of things reversed, but every one who has anything to do with the pig iron trade has become convinced that the hold of Great Britain on the Canadian market is a thing of the past.

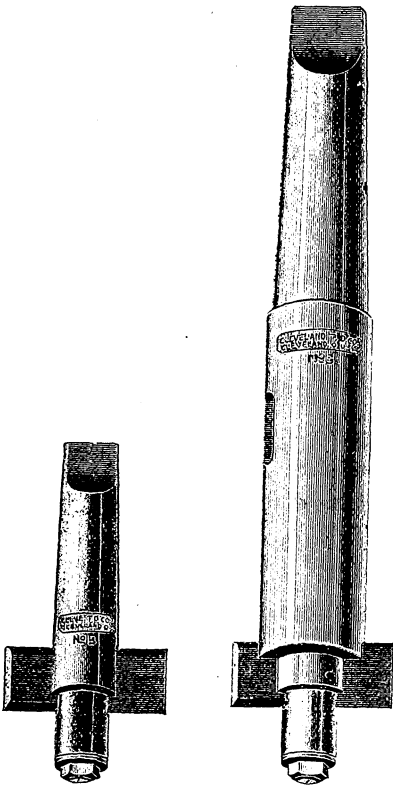
The Sioux City Engine Works.

At Sioux City, Iowa, on the 17th ult. the equity in the Sioux City Engine Works was sold at receiver's sale to a local syndicate for \$20,000. The establishment was one of those involved in the failure of the Union Loan & Trust Company last April. The bonded indebtedness is assumed by the new owners. On the day advertised for the sale the people of Sioux City learned that there was danger of the plant being purchased for removal to Kewanee, Ill., and within an hour they organized the syndicate above referred to. On the 19th this syndicate and the Pech Mfg. Company consolidated their interests, and the business of manufacturing engines formerly conducted by the engine works company, and of making well machinery, seeders, farm implements and miscellaneous articles, carried on by the Pech Company, will be conducted in the engine works plant in the future by the Sioux City Engine & Iron Works Company. The new company will have an authorized capital stock of \$240,000, of which \$120,000 has already been subscribed and paid in. The provisional directors of the new company, who will hold office until the first Monday in March, 1895, are: W. M. Thompson, president and general manager; C. Bevan Oldfield, vice-president; E. H. Bucknam, secretary; J. H. Dickey, assistant secretary, and A. F. Call, W. P. Manley, C. A. Finkbine of Des Moines, and R. H. Brown of Storm Lake. The plant will be put in operation in a very short time, or as soon as the necessary repairs and rearrangement of machinery can be made.

George E. Drummond of the Canada Iron Furnace Company, Limited, of Montreal and Radnor Forges, Quebec, has issued in pamphlet form his interesting address, as vice-president of the General Mining Association of Quebec, on "The Iron Industry of Canada." He reviews the history of that industry in Great Britain and in the United States, and presents data relating to the blast furnaces now in operation in Canada, to show their rapid development recently and their capacity for further growth. The plants in question are the New Glasgow Iron, Coal & Railway Company of Ferrona, N. S., with one 65 foot furnace which produced in nine months' campaign in 1893, 22,500 net tons of coke iron; the Pictou Charcoal Iron Company of Bridgeville, N. S., recently running, with a capacity of 5000 tons of charcoal iron; John McDougall & Co. of Drummondville, Quebec, with two small charcoal stacks, and the Canada Iron Furnace Company at Radnor Forges, Quebec, which in 1893 made 7423 net tons of charcoal iron.

Counter Bore or Facing Bar.

The blade or cutter of the counter bore bar which is made by the Cleveland Twist Drill Company of Cleveland, Ohio, is held centrally in the taper plug by a conically pointed set screw shown in the illustration. This plug or holder, as it is called, is fitted into the ordinary twist drill socket of any convenient size, the end of the socket having a slot or notch milled across its open end to receive the top of the blade or cutter. By this arrangement the whole strain comes on the larger socket or driver, and there is no twisting or other strain whatever on the smaller part. The end of the holder is turned down as small as is



Counter Bore or Facing Bar.

consistent with the necessary strength, and hardened steel bushings of various sizes are furnished with each tool to act as leaders or pilots. Blades of the correct angle for countersinking for screw driver headed machine screws can be furnished extra. These tools are no experiment, as they are already in use in some of the foremost shops in the country, from the smallest size up to blades 6 inches long. The several parts are made to standard jigs and are carried in stock, so that any piece can be duplicated with the certainty that it will fit into its place properly.

A bill has been introduced in the New York State Legislature to incorporate the Niagara Falls Park Bridge Company, with a capital of \$400,000. The incorporators are: William J. West, W. Harry Cornell, Niagara Falls; Charles Fell, John M. Brinker, Charles B. Hill, Buffalo; J. H. Mille, Frank E. Hayward, John H. Mooney, William H. Kelly, Charles Murphy, A. N. Alexanderson, New York City. It is the purpose of the company to construct one or more bridges across the Niagara River, between the United States and Canada, for passenger and

other traffic; one at or near the Niagara Falls and another at or near the whirlpool.

Southern Freight Rates.

The Queen & Crescent Route has issued two new pig iron tariffs, giving the rates in carload lots from Southern furnaces to all points. The rates on East bound pig iron are effective February 20 and are as follows to the more important points:

| To                                 | From Chattanooga, Tenn. | Birmingham District. | Sheffield District. |
|------------------------------------|-------------------------|----------------------|---------------------|
| New Jersey:                        |                         |                      |                     |
| Camden.....                        | 4.77                    | 5.02                 | 5.12                |
| Elizabethport.....                 |                         |                      |                     |
| Hoboken.....                       |                         |                      |                     |
| Newark.....                        | 5.00                    | 5.50                 | 5.25                |
| Paterson.....                      |                         |                      |                     |
| Phillipsburg.....                  |                         |                      |                     |
| Jersey City (rail and water).....  | 4.05                    | 4.01                 | ....                |
| Jersey City (all rail).....        | 5.00                    | 5.50                 | 5.25                |
| Trenton.....                       | 4.60                    | 5.10                 | 4.85                |
| New York:                          |                         |                      |                     |
| Albany.....                        | 4.83                    | 5.33                 | 5.08                |
| Binghamton.....                    | 4.60                    | 5.10                 | 4.85                |
| Canandaigua.....                   | 4.20                    | 4.70                 | 4.45                |
| Elmira.....                        | 4.40                    | 4.90                 | 4.65                |
| Hornellsville.....                 | 4.23                    | 4.78                 | 4.53                |
| Hoosick Falls.....                 | 5.40                    | 5.90                 | 5.65                |
| Lithaca.....                       | 4.40                    | 4.90                 | 4.65                |
| Middletown.....                    | 5.00                    | 5.50                 | 5.25                |
| New York (rail and water).....     |                         | 4.01                 | ....                |
| New York (all rail).....           | 5.00                    | 5.50                 | 5.25                |
| Oswego.....                        | 4.20                    | 4.70                 | 4.45                |
| Rochester.....                     | 3.96                    | 4.46                 | 4.21                |
| Rome.....                          | 4.60                    | 5.10                 | 4.85                |
| Schenectady.....                   | 4.83                    | 5.33                 | 5.08                |
| Syracuse.....                      | 4.20                    | 4.70                 | 4.45                |
| Troy.....                          | 4.83                    | 5.33                 | 5.08                |
| Utica.....                         | 4.60                    | 5.10                 | 4.85                |
| Watertown.....                     | 5.00                    | 5.50                 | 5.25                |
| Pennsylvania:                      |                         |                      |                     |
| Allentown.....                     | 4.60                    | 5.10                 | 4.85                |
| Bethlehem.....                     | 5.23                    | 5.53                 | 5.63                |
| Birdsboro.....                     | 4.62                    | 4.87                 | 4.97                |
| Floomsburg.....                    | 4.60                    | 5.10                 | 4.85                |
| Braddock.....                      | 3.90                    | 4.40                 | 4.15                |
| Catsauqua.....                     | 4.60                    | 5.10                 | 4.85                |
| Conshohocken.....                  | 4.62                    | 4.87                 | 4.97                |
| Easton.....                        | 4.6                     | 5.10                 | 4.85                |
| Harrisburg.....                    | 3.88                    | 4.13                 | 4.23                |
| Lancaster.....                     | 4.41                    | 4.66                 | 4.76                |
| Philadelphia (rail and water)..... |                         | 4.61                 | ....                |
| Philadelphia (all rail).....       |                         |                      |                     |
| Phoenixville.....                  | 4.62                    | 4.87                 | 4.97                |
| Pottstown.....                     |                         |                      |                     |
| Pottsville.....                    | 4.67                    | 4.92                 | 5.02                |
| Scranton.....                      | 4.60                    | 5.10                 | 4.85                |
| Steelton.....                      | 4.16                    | 4.41                 | 4.51                |
| Wilkesbarre.....                   | 4.60                    | 5.10                 | 4.85                |
| York.....                          |                         | 4.26                 | ....                |
| Vermont:                           |                         |                      |                     |
| All points ..                      | 5.40                    | 5.90                 | 5.65                |

The rates from Dayton and Rockwood, Tenn., are the same as those from Chattanooga.

The tariff governing points North, South and West is effective February 22, some of the rates being as follows:

| To                                    | From Dayton and Rockwood, Tenn. | Chattanooga, Tenn. | Birmingham District. | Sheffield district. |
|---------------------------------------|---------------------------------|--------------------|----------------------|---------------------|
| Aurora, Ill. ....                     |                                 |                    |                      |                     |
| Chicago, Ill. ....                    |                                 |                    |                      |                     |
| Dubuque, Iowa. ....                   | 3.20                            | 3.40               | 3.65                 | 3.40                |
| Joliet, Ill. ....                     |                                 |                    |                      |                     |
| Columbus, Ohio.....                   | 2.70                            | 2.90               | 3.40                 | 3.15                |
| Detroit, Mich.....                    | 3.40                            | 3.60               | 3.85                 | 3.60                |
| Leetonia, Ohio.....                   | 3.25                            | 3.45               | 3.95                 | 3.70                |
| Milwaukee, Wis. (all rail).....       | 3.65                            | 3.85               | 4.10                 | 3.85                |
| Milwaukee, Wis. (rail and water)..... | 3.35                            | 3.55               | 3.80                 | 3.55                |
| Minneapolis, Minn.....                | 4.90                            | 5.10               | 5.35                 | 5.10                |
| Muncie, Ind.....                      | 2.80                            | 3.00               | 3.25                 | 3.00                |
| Racine, Wis.....                      | 3.65                            | 3.85               | 4.10                 | 3.85                |
| South Bend, Ind.....                  | 3.20                            | 3.40               | 3.65                 | 3.40                |
| St. Paul, Minn.....                   | 4.90                            | 5.10               | 5.35                 | 5.10                |
| Toledo, Ohio.....                     | 2.90                            | 3.10               | 3.60                 | 3.35                |
| Wyandotte, Mich.....                  | 3.45                            | 3.65               | 3.90                 | 3.65                |
| Zanesville, Ohio.....                 | 2.95                            | 3.15               | 3.65                 | 3.40                |



## THE WEEK.

The climax of unreasonableness in the way of strikes seems to have been reached recently at Providence, R. I., where 300 unemployed and needy men were given work at \$1 a day by the Commissioner of Public Works. On finding that they were required to work for ten hours a day the whole gang struck rather than work over nine hours.

The Cleveland, Ohio, Chamber of Commerce is arranging for the celebration in 1896 of the city's centennial.

The United States Patent Office is now less in arrears with its work than has been the case for the past seven or eight years.

Southern journals agree in discerning a solid and genuine revival of business prosperity in the South; the result, largely, of organized effort to attract investment to the centers of population and to advertise the towns. The revival does not partake of the nature of a "boom," but is an honest advance in growth and values, which bids fair to be permanently progressive.

An important canal project, calculated to revolutionize lake traffic, is said to have the support of a number of New York, Chicago, Boston and London capitalists. The plan is to construct a canal, capable of accommodating the heaviest vessels, directly across the State of Michigan from the eastern shore of Lake Michigan either to Detroit or Toledo. Preliminary surveys of these routes have been made and the scheme pronounced by eminent engineers to be perfectly feasible. Either canal would be about 180 miles long, and would greatly facilitate the passage to the East of vessels from Chicago, Milwaukee and other Northwestern points, rendering unnecessary the present long water route through the Straits of Mackinaw, Lake Huron, St. Clair River and Lake, and down the Detroit River to Lake Erie.

It is calculated by the Mint Bureau officials that the gold production of the United States for 1893 will reach a total of \$37,000,000 in value, as against \$33,000,000 for 1892. Colorado alone contributes an increase of from \$3,000,000 to \$4,000,000, Montana, Arizona and New Mexico also showing gains. These figures bring up last year's gold production in this country to a point exceeding that of the bonanza period. The world's total gold production in 1893 is estimated to be more than \$150,000,000, a gain of at least \$12,000,000. These figures, in view of the fact that the output of silver last year was the smallest for many years, are reassuring as evidence that the gold supply will be entirely adequate for monetary purposes for some years to come.

Statements received at the Department of Internal Affairs at Harrisburg, Pa., showed that the railroads in the State carried much more freight in 1893 than in 1892. The tonnage from the mining districts increased from 171,913,484 tons to 180,534,176; products of forests from 15,853,793 to 16,602,476; manufactures from 35,538,399 to 40,147,802; merchandise from 20,862,902 to 25,911,492. The tonnage of agricultural products decreased from 19,174,726 tons to 18,477,085. In 1892 the aggregate tonnage was 263,333,304 tons, and in 1893 281,673,031.

Coal mines in Colombia are to be developed by a syndicate of American

capitalists, the Colombian Government being a partner in the enterprise.

A police census of the unemployed, recently completed in Brooklyn, shows that about 30,000 persons are out of work in that city.

Eastern real estate men look for more activity in their business during the coming month. Inquiries regarding investments in this field show a marked increase.

Final action has been taken by the trustees of the Brooklyn Bridge in relation to the terminal improvements in Brooklyn. The plan for extending the bridge terminal to Tillary street and the erection of a station at that point, involving an expenditure of from \$3,000,000 to \$4,000,000, was abandoned, and the plans prepared by the bridge engineers a year ago accepted. The total cost will not be more than \$300,000. It is probable that the cars on the bridge will be lighted with Pintsch gas, recent experiments with that system having proved satisfactory.

The White Star Steamship Company, in a letter to the New York Dock Board requesting increased pier accommodations, announce that they are contemplating the construction of a ship whose length will be about 640 feet, but it will be impossible for them to proceed with the plans of this vessel until they are assured of obtaining adequate pier space. This company, says the *New York Marine Journal*, handled last year some 900,000 tons of cargo and over 100,000 of coal, their wharf expenses, labor, &c., amounting to nearly \$500,000.

The official statement of the Treasury receipts from internal revenue for the first seven months of the current fiscal year shows a decrease of over \$12,260,000 as compared with the corresponding period of last year. The falling off was almost wholly confined to the revenue receipts on tobacco, spirits and fermented liquors. January's aggregate receipts were nearly \$1,000,000 less than those for January, 1893.

The Legislature of San Luis Potosi, Mexico, have decreed the exemption from all taxation of new industries locating in that district. The ordinance provides that all such industries established within the next five years shall be free from taxation for a term graduated according to the amount of the investment. It is hoped to stimulate the investment of foreign and especially American capital in the lands and mines of the State of San Luis. This example will, it is believed, be followed by other States of the Mexican Republic.

The first practical system of towing canal boats by electricity has just been inaugurated on the Bourgogne canal, says the *New York Marine Journal*, connecting the Seine and Saone rivers, France. The power is furnished by water falling from sluices at the two ends of the canal, and the current is made steady by means of storage batteries. The trolley system is used.

Ice is more than likely to be dear during the coming summer.

The *British Export Journal* says that \$2,500,000 worth of American apples are consumed in England yearly, besides \$500,000 worth from Canada. An average of not less than 70,000 barrels of apples from the United States are, it adds, sold in the English market weekly during the four months from October to the end of January, and the trade is growing.

The North of England settlement of coal miners in the Monongahela Valley is said to be becoming depopulated by the departure for home of the Scotch families located there, of which some 40 have already departed, while others are on the point of leaving. The movement is caused by the recent severe reduction in wages, whereby they have been brought down to a lower rate than the miners could earn at home.

Accidents in and about coal mines in Great Britain during 1893 caused the death of 1056 persons, an increase of 40 over the record for 1892.

Work on the new cable between Nova Scotia and the coast of Ireland will be commenced shortly. The cable will be 2200 miles long.

Of the 17,513 coke ovens in the Connellsville region, 9780 were in blast at the end of last week.

Western railroads have had an arduous task in fighting the snow during the recent severe weather. Snow plows have been kept constantly in operation, and comparatively little delay of traffic has occurred, although snow drifts of 10 to 15 feet in depth have been reported from some sections of the far West.

**Foundrymen's Association.**—The thirty-fourth meeting of the Foundrymen's Association will be held at the Manufacturers' Club in Philadelphia on Wednesday, March 7, at 8 o'clock p. m. There will be a discussion on W. J. Keep's paper entitled "Foundry Chemistry," as to whether chemistry or the ordinary practice used by foundrymen in mixing their irons, &c., can better be depended upon for foundry practice. A number of analytical chemists are expected to be present at the meeting to take part in the discussion.

The C. & C. Electric Company have removed their office to 143 Liberty street, New York, and their works to Garwood, N. J., on the line of the Central Railroad of New Jersey.

Chas. N. Butler, C.E., lately of Washington, D. C., has opened an office in the Mutual Life Building, Philadelphia, where he will practice as an attorney in patent cases. Mr. Butler was for some years a member of the Examining Corps in the U. S. Patent Office.

Francis I. Maule of 328 Chestnut street, Philadelphia, advertisement writer, and for many years a partner in the late well-known firm of Pancoast & Maule of Philadelphia, dealers in engineers' supplies, has just issued a 14-page booklet pertaining to the subject of advertising. A notable feature in the booklet is the style of printing employed. Each page is made to represent a newspaper cutting pasted on manilla paper, and the effect is very striking.

Calvin E. Pease and William C. Green have formed a partnership under the name of the Machinists' Supply Agency, at Dayton, Ohio. Their business will be mostly confined to dealing in machinery and supplies, such as pulleys, belting and raw materials used in machine shops and foundries, together with a line of machinists' hand tools.

Cast iron car wheels have sold lately at a shade under 1 cent per pound, delivered.

# The Iron Age

New York, Thursday, March 1, 1894.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.  
CHAS. KIRCHHOFF, - - EDITOR.  
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.  
RICHARD R. WILLIAMS, - HARDWARE EDITOR.  
JOHN S. KING, - - - BUSINESS MANAGER.

## Freight Rates and the Northwestern Iron Trade

The Chicago pig iron manufacturers are now making some impression on the railroad managers, who have hitherto given them scant consideration. Light traffic and diminishing revenues are powerful agencies with which to co-operate. The lines running to the Northwest especially cannot afford to overlook opportunities from which they are absolutely certain to reap considerable benefit if properly handled. The expansion of the iron trade of Chicago, and, of course, its vicinity, including Northern Indiana and Southern Wisconsin, is too important a matter to be overlooked. Grain, flour, lumber, provisions and miscellaneous farm products are not moving now in such vast quantities that the interests of local industries can be neglected and left to shift as best they can. In the arrangement of local rates hitherto an arbitrary schedule has been made which bore no relation to the value of the commodity, the amount of business to be done in it, the conditions of the trade, or the *pro rata* received for the same haul on pig iron brought into the territory from distant localities. In this way an actual, although unintentional, discrimination was made against local industries. How serious this has been is shown by a few instances. To a certain point in Wisconsin the freight on pig iron shipped from Chicago is 85 cents per ton, but on Southern iron the road only receives 50 cents per ton as its proportion of the through rate. In another instance the local rate is \$1 per ton, while the *pro rata* on Southern iron has been for a long time only 25 cents. To a more distant point the rate on Chicago pig iron is \$2 and the *pro rata* on Southern iron is \$1.86, but for years the Chicago rate had been \$2.50, and was only reduced to \$2 after a prolonged agitation. These comparisons not only show how Chicago pig iron has been handicapped in its own territory, but also how arbitrary the arrangement has been.

The cause of this apparent discrimination is not hard to seek. In the meetings of the traffic associations by which freight rates are adjusted the Southern railroads have persistently looked after rates on pig iron and lumber, two important commodities seeking Northern markets. The Northern roads, having a multiplicity of inter-

ests, were not specially solicitous as to pig iron and rather easily yielded concessions on pig iron and lumber in return for such privileges as they received from Southern roads. Having abundant resources for freight traffic they withstood the complaints of their local pig iron manufacturers and left them to work out their own salvation. For the first time in their history they are now brought to a realizing sense of the business lying dormant in almost their own freight yards which might be encouraged and made to yield much larger returns.

The general treatment of the pig iron trade by Northern railroads has never been of as considerate a character as that given by Southern roads to the manufacturers of that section. The sliding scale arrangement for basing freight rates on the selling price of pig iron, which was in vogue in the South for so long a period, never found lodgment in the North. The Northern manufacturer has always had to seek markets as best he could, and when bottled up by adverse conditions, quietly retired from business and patiently awaited a change. This lack of consideration of such important freight makers as blast furnaces is forcibly shown by the rate charged on pig iron in the central West. Five years since, when foundry pig iron sold at \$18 at the furnace, the freight rate from producing points to the best Northwestern markets was \$2 per ton. To-day, when the same class of iron sells at \$12 50 or less, the freight rate is unchanged at \$2. The freight now represents 16 per cent. of the value of the iron, whereas five years since it was but 11 per cent. These are subjects for railroad officials to ponder over, especially those who might haul coke, ore, limestone and other supplies to active furnaces in the proportion of at least 5 tons of freight to the 1 ton of mere pig iron which they now haul.

## Workmen Changing Occupations

The protracted idleness of many iron and steel works and the intermittent operations of others have driven many of the workmen into new occupations. As skillful men are usually the most ambitious and will make opportunities instead of waiting for them, they are fairly successful in finding something to do. The continuance of the depression in the iron trade will have a tendency to make them permanent fixtures in their new vocations. A strong probability thus exists of a scarcity of skilled labor when manufacturing establishments resume their normal activity. This is not one of the least annoying features of a long shut down. The efficiency of a plant depends so much on a well drilled organization of workmen that manufacturers usually strain their resources before

they will permit their works to lie idle and their employees to scatter. Inducements to return to this class of employment will also be less potent in the future, as wages have been so severely cut that the iron trade is not likely to be so prominent in the matter of remuneration for services rendered. A restoration of activity may and very probably will bring about an advance after wages have been driven by the trade depression to their lowest point, but the palmy days for iron workers which ended so recently have gone not to return in their full glory until some industrial revolution again overturns the commercial fabric.

## Stability of Our War Ships.

A communication of unusual interest, on a topic that has been widely discussed and criticised with more or less ability, was published in the *New York Sun* of the 26th ult. It was from Chas. H. Cramp, the eminent shipbuilder. It dealt with the question of the stability of the new vessels of the navy, and reviewed in detail the case of the cruiser "Philadelphia," bringing the whole subject under a new light that will unquestionably tend to modify many of the opinions which have been held regarding the stability problem.

Mr. Cramp states that, "even if certain of the smaller ships had a small margin of stability it does not follow that they were unsafe, and the alleged defect as reported might have been remedied at small expense of time and money, and without scandal or even discredit," but he does not mention any of these vessels nor does he present the remedy. Concerning the Washington dispatch to the *Sun* of February 16 in which is the statement that "the disclosure of the want of stability in the 'Detroit' has been followed by similar discoveries in vessels of other classes, &c., which has led to the appointment of a stability board," &c., Mr. Cramp states that he has no personal bias in favor of the "Detroit," as she was designed by the Navy Department and built by the Columbian Iron Works of Baltimore. While he does not know what this statement as to her lack of stability is based on, he does know that "she made a voyage to the South Atlantic, where she is now cruising, and where she had the honor to fire the first gun heard for many years in protection of American interests; and I also know that no ship so deficient in stability as to require the services of a board could do those things."

We now reach the most important part of the communication—that dealing with the "Philadelphia," which was built by Mr. Cramp in accordance with plans submitted by himself. He states that from the day the bids and plans were opened and the award made the watchword has been "down the 'Philadelphia'!" "To damn our only cruiser

designed by a civilian." More than two years since Mr. Cramp was asked to discuss a paper to be presented to the U. S. Naval Institute "On the Metacentric Height and Behavior in a Seaway of the U. S. S. 'Philadelphia' and Kindred Subjects." We quote as follows from Mr. Cramp's reply to this request :

The fourth paragraph of the paper states that its "object is to demonstrate by graphic representation the general causes of the ship's (the 'Philadelphia's') failure, &c." This is the first and only information that I have had of the "ship's failure." In the absence of other and more authentic data, I must be permitted to maintain the opinion that the ship has not failed, and that, therefore, there is no ground on which the proffered "discussion" can be rationally conducted. If the commanding officer, Capt. Fred Rogers, or the admiral whose flagship she is, Bancroft Gherardi had offered the paper in question, I would, without doubt, consider it incumbent on me to "discuss" the subject. If the ship has "failed" they would certainly be aware of the fact, and their professional reputation does not permit one to doubt that they would have notified the Government of it promptly.

The "Philadelphia" was built, tried, accepted and paid for according to the terms of the contract, and she has been in commission ever since as the flagship of the North Atlantic squadron. As her designer and builder I prefer to rest her case on her record afloat.

As I have intimated, if Admiral Gherardi or Captain Rogers has any fault to find with the "Philadelphia" I will meet either or both of them in whatsoever discussion professional courtesy may require. But I must be excused from such relations with the Mr. Hemje whose name is mentioned at the head of the paper before me.

This would evidently seem to dispose of the statement in regard to the "failure" of the "Philadelphia," about which it is said: "She has the most commodious quarters for officers and enlisted men; there are but four ships of her class in the navy; she can do more work on a given coal supply than any of the others; with deck protection equal to the best of the other three, she can, by reason of her lighter machinery, carry 100 tons more of coal, stores or ammunition." Mr. Cramp does not deny that certain changes were made in the design submitted by him, but he avers that these alterations were unnecessary and that she remains the best ship of her class in every particular of practical value pertaining to a cruising man-of-war.

If further proof were needed the following announcement, under date of February 26, by S. L. Seymour, division freight agent of the Pennsylvania Railroad at Pittsburgh, shows that cutting on freight rates on steel billets has prevailed lately in that center: We have agreed with the B. & O. R. R. that on and after March 5 we will strictly maintain rates on billets and billet articles to Baltimore and Baltimore points at \$2.10 per gross ton, to Philadelphia and Philadelphia points at \$2.30 per gross ton and to New York and New York points at \$2.70 per gross ton. The tariff on iron articles to be also strictly main-

tained at the fifth and sixth class rates." While this announcement apparently removes the source of much dissatisfaction East and West, it does not meet the criticism made that only very few among even the largest makers were given the advantage of the special rates made. If rates of freight are subject to negotiation on the basis of quantities involved, all large shippers should be given an equal chance.

### The House Organ.

The publication of house organs appears to be on the increase. Manufacturers, and numerous merchants as well, are of the opinion that a fallow field lies invitingly in this direction, ready to yield rich returns if properly cultivated. A member of the firm or an employee with literary aspirations undertakes the preparation of a periodical, or mayhap an occasional publication, which furnishes information of more or less interest and value to those specially connected with their line of trade, and incidentally advertising the goods which they manufacture or handle. The publication is then mailed gratuitously to as complete a list as can be worked up of those whose trade it is desirable to secure. The plan is not new, as some long established concerns have from time immemorial published "circulars," "bulletins" or "journals" at stated intervals and distributed them to possible patrons. But while the idea is old, its greatest development has been quite recently, so that it almost appears to be new. Matters are fast getting into such shape now that a manufacturing or mercantile establishment will not be considered completely equipped for business unless it can boast of its own organ with its well organized publication department and very complete editorial corps. Some of these periodicals are of a really high order. They are beautifully printed, magnificently illustrated, and contain very instructive articles in their special line. They would be exceedingly creditable as independent publications, and are worthy of an existence. In fact, publications of this class are so well appreciated that their circulation lists are in danger of becoming unwieldy, and in some instances a subscription fee is exacted, which will, of course, only be paid by those to whom the publication is of genuine value. There are others, however, which have no special merit. They are mere advertising circulars, giving no interesting news, no original information, no results of tests or investigations, but are only devoted to puffing the house which stands sponsor for the publication. Yet money is thrown away in bringing them out regularly, in the hope that some trade may be influenced. This is, perhaps, the case, for printers' ink must be credited

with a great deal of power. Even circulars are glanced at before they are thrown into waste baskets, and some of them have been known to lead to rather important results.

We do not share in the apprehension felt in some quarters that these house organs are destined eventually to supersede trade papers. The trade press has its legitimate function, which such private publications can by no means fill. In nearly every case the latter only cover a narrow field and rarely attain special distinction. The crop of fresh ideas is apt to run out, and the ambitious journalistic amateur who starts out to make an indelible impression on his customers finds that fresh talent must be won to his assistance if he would keep his venture from traveling in a rut. The house organ will have its day, like other experiments, and while the fever runs will be beneficial to printers and paper manufacturers. If the number of such publications could be limited to, say, one or two concerns in each particular line, the enterprising publishers would very probably reap advantages. But when this method of advertising becomes common there is nothing in it for any one in particular, and the practice of issuing such publications merely becomes a heavy tax. It appears to us most unwise to depend exclusively on such a scheme of advertising and to abandon, even temporarily, the trade journals which are recognized leaders in their lines.

Eight of the 20 customs districts in the United States in which the ownership of vessel tonnage on June 30, 1893, exceeded 50,000 tons were on the Great Lakes. New York is the only district in the country that exceeds Cleveland in steam tonnage, while the amount of steam tonnage owned in Buffalo is greater than in any district excepting those named and San Francisco. The New York district owns 1134 steam vessels, having a total tonnage of 441,265, while the Cleveland district owns 177 steam vessels having an aggregate tonnage of 183,346. Cleveland, with less than one-sixth the number of steam vessels, has more than one third the tonnage of New York. The total tonnage of sail, steam and canal boats of the principal districts of the Lakes is as follows: Cleveland, 241,093; Buffalo, 172,316; Port Huron, 169,137; Detroit, 160,165; Milwaukee, 95,743; Chicago, 90,530. The annual reports from the office of the Commissioner of Navigation prove that the Lakes are steadily gaining on other sections of the country in ownership of steam vessels. As specimens of marine architecture, the boats built on the Lakes are only exceeded by the Atlantic liners in the matter of size; in regard to design, equipment and workmanship there is but little choice between the two classes.

## OBITUARY.

## THOMAS BARNES.

Thomas Barnes of the Barnes Safe & Lock Company, Pittsburgh, Pa., died on the 21st ult., from injuries received in falling down stairs. Mr. Barnes was born in Dublin, Ireland, December 18, 1817; came to Pittsburgh when about 19 years of age. In 1845 he began business as a manufacturer of safes in partnership with his brother-in-law, Edmund Burke, the firm being known as Barnes & Burke until the death of Mr. Burke in 1873, after which the firm name was changed to the Barnes Safe & Lock Company.

## AUSTIN BURT.

Austin Burt, a well-known citizen of Detroit, Mich., is dead, at the age of 76. Mr. Burt was the son of William Austin Burt, the inventor of the solar compass and Surveyor-General of Michigan. He came to Michigan in 1824, and has been associated with many important enterprises. He was one of the promoters of the Lake Superior Iron Company and also became interested in the Peninsular Iron Works and the Union Iron Works. He was one of the original movers in the Detroit Transit Railway Company, and was president of this company for many years.

## PERSONAL.

A movement has been started in England to record the appreciation of the iron, coal and chemical trades of the services of Sir Lowthian Bell. It is proposed to invite him to sit for his portrait and to place it at his disposal with a replica in some public building in Middlesborough. The following committee has been organized: Sir Joseph Pease, chairman; J. H. Amos, Henry Cochrane, Arthur Cooper, Colonel Davies, R. E., Sir Raylton Dixon, David Evans, R. Grigg, Wm. Hanson, W. R. Innes Hopkins, W. Jenkins, J. M. Lennard, E. Windsor Richards, Joseph Richardson, Thomas Richardson, T. D. Ridley, Colonel Sadler, Sir B. Samuelson, Joseph Walton, Illtyd Williams and Thomas Wrightson.

At a meeting of Carnegie Library Board of Trustees, held in Pittsburgh last week, W. N. Frew of that city was elected chairman to fill the vacancy caused by the death of James B. Scott.

Ed. A. Uehling has resigned his position as furnace manager of the Sloss Iron & Steel Company. Mr. Uehling will remain at Birmingham for the near future.

B. L. Olds has been appointed purchasing agent of the Union Pacific, Denver & Gulf Railway Company, with headquarters at Denver, Col.

Hosea Webster has been transferred from the management of the Chicago house of Henry R. Worthington to the position of sales manager for the entire establishment, necessitating his removal to New York. Mr. Webster has been located in Chicago for ten years, and, while he has made hosts of friends there who will regret his departure, all will be pleased to hear of his advancement, which is a recognition of his arduous services and substantial merit.

C. J. H. Woodbury of Boston will deliver on March 1 the second of the course of lectures being given to the students in the mechanical and electrical courses in the University of Pennsylvania. His topic will be "The Evolution of the Modern Mill."

## Trouble in the Building Trade.

The carpenters of the country have not abandoned the effort to establish a general eight-hour day. District conventions were held throughout the country on the 22d ult., to continue the agitation of this question. One of the most important of these meetings was held in Chicago, delegates being present from a number of large cities in Illinois, Indiana, Iowa, Wisconsin and Michigan. A series of resolutions was adopted to the effect that it was the sense of the convention that the time had arrived when an eight-hour day was necessary to furnish employment for the greatly increased number of men seeking work, and also to furnish more time to workmen for recreation and self improvement. April 1 was the date set to make a universal move to secure such a result. The hours of work were established from 8 till 5 o'clock, with an hour intermission in the middle of the day. All overtime, including Sundays and holidays, is to be counted as time and a half, and only allowable when the work is in immediate danger. As it is the evident intention of the leaders in this movement to force the payment of ten-hour wages for an eight-hour day, the prospect favors a bitter struggle between employers and workmen in the spring. This is unfortunate, because building projects had latterly become encouragingly numerous, and business in related lines promised to be greatly benefited. Instead of employment being secured for more men in the building trades, as set forth in the resolutions, this action may lead to the employment of but few. This would be most deplorable.

H. W. Wells, formerly superintendent of motive power with Thomas A. Edison, and lately with H. M. Sciple & Co., Philadelphia, has associated himself with W. H. Hallman, late of the A. Hallman Stove Company of Philadelphia, at 59 North Seventh street, Philadelphia, where, under the firm name of Wells & Hallman, they will deal in boilers and engines and all kinds of new and second-hand machinery. They will also undertake the installation of steam and electrical plants, and handle engineers' supplies. They have been appointed agents for the Bay State Iron Works of Erie, Pa., and will push sales of the engines, boilers, cranes and hoisting machinery made at those works. The members of the new firm are well known to the trade and are confident of doing a good business.

The American Steel Casting Company.—Reports have been published in the Philadelphia newspapers to the effect that the manufacturers of steel castings had, with the exception of the Midvale Steel Company, agreed to go into a pool. We have the very best authority for stating that this is untrue. Such a scheme was on foot over a year since, but fell through. Several months since a combination was proposed, but a number of makers declined to consider the matter. It is true, however, that on Saturday last a company was formed, under the style of the American Steel Casting Company. As yet no officers have been elected, and the entire undertaking which the new company represent is still in a formative condition. Those who are organizing the consolidation state emphatically, however, that no pool or combination is aimed at.

## CORRESPONDENCE.

## Keep's Foundry Chemistry.

To the Editor: There seems to be an impression among those who were present during the reading of W. J. Keep's paper on the subject of "Foundry Chemistry" at the February meeting of the Foundrymen's Association that the statements made were antagonistic to the use of chemical tests in foundry practice. Whatever statements may emanate from so eminent an authority on this subject are likely to carry great weight, and it would certainly be somewhat of a surprise if, after all the investigations made by Mr. Keep, he should finally come to the conclusion that the old rule of thumb practice were the only one practicable in the foundry shops.

It would be very strange, indeed, if this should be the result arrived at by Mr. Keep after all his valuable investigations, which have served others as an incentive to work in the same direction, but whose conclusions have been very different. If Mr. Keep's opinion should really be that there would be little to gain for the foundryman by a more general use of chemical tests, it is evident that his investigations were not made with a view of applying the results in foundry practice, and it is still more evident that Mr. Keep himself has not made any practical use of them in his own shop.

Mr. Keep advises the foundrymen that no other element than the silicon is worth looking for in irons, under the supposition that ordinary foundry irons are in other respects all that can be desired. This statement may apply to the particular irons going into mixtures for stoves at Detroit, but can certainly not be applied to irons for more delicate work of many kinds requiring highest possible strength in conjunction with other properties, for which the irons should be intelligently selected. But even for stoves it has been found more advantageous to guard against mistakes in making the mixtures, at least in this section of the country, where the market is overrun with a large variety of irons, the compositions of which change considerably from time to time. The superintendent of a large stove foundry here informs me that since they employed the services of a chemist, some four years since, they have not made 1 pound of iron that was not suitable for their work; that they have found that it pays to keep a chemist on the premises; and that they cannot afford to dispense with his services. The same has been the experience of others who have abandoned the rule of thumb practice—few as they are as yet—and who compute their mixtures on the basis of chemical analysis. Such foundrymen as are experiencing difficulty in using up their scrap piles, or who find themselves in "hot water" otherwise, I would refer to S. Bolland's book, "The Founder's Supplement," p. 22, where they will find some valuable advice.

Mr. Keep says: "Any marketable iron can be used if properly mixed with other marketable irons." If this statement be intended to belittle the value of analysis, it does just the reverse. For how could the irons be mixed properly without acquaintance with their merits—that is to say, with their chemical composition? And how can the quality of the fuel be ascertained unless by laboratory tests? Mr. Keep says further: "For economic reasons he (the founder) ought to use all the scrap he can, and he can

get no satisfactory analysis of this and pig iron will not run uniform." Here I agree with Mr. Keep. As a rule it is, for certain and good reasons, of little use to analyze scrap. Cast iron scrap may be said to be of four distinct grades, each requiring different doses, from 0.5 to 2 per cent. of silicon, in order to obtain the best results. It should therefore be assorted when offered for sale, as each grade has very different values to the founder. As Mr. Keep admits that pig irons do not run uniform, this ought to be a strong reason for having them analyzed.

Mr. Keep states that "silicon as it exists in one kind of pig iron will be much more effective than that in another brand, and by using one 2 per cent. silicon brand will do more than 2.5 per cent. from another brand." In his valuable pamphlet on "The Influence of Silicon in Cast Iron," Mr. Keep asserts that "irons receive in the blast furnace certain tendencies which will exert their influence in the most unexpected ways." If these two statements are correct, and I have had frequent opportunities to convince myself that they are, how much more reason is there to ascertain what causes these tendencies, which are dependent upon the amounts of the other usual elements to be found in irons, especially those of combined carbon and manganese. If an iron carrying only 2 per cent. of silicon is more effectual than another carrying 2.5 of the same element, there must be some good reasons for it, which will invariably be revealed by analysis.

Mr. Keep says that "practically the grayness of pig iron or of a casting is dependent upon the per cent. of silicon present, and if it contains enough silicon to make it gray its combined carbon will be low." To my knowledge Mr. Keep is the only metallurgist who ascribes the gray fracture of pig iron to the silicon. As a rule, the fracture of irons running over 3.5 per cent. of silicon becomes lighter somewhat in proportion to the increase of the silicon and decrease of the graphitic carbon. The influence of the graphitic carbon upon the color of the fracture is best shown from the fact that castings of a dark color are made in the cupola (regularly, I believe, at the place I have in mind) from materials containing much less than 0.5 per cent. silicon and 0.1 per cent. carbon, which after remelting contains 4 per cent. carbon and about the same per cent. of silicon as the charge.

Mr. Keep says that "carbon in pig iron will vary in total amount, but we will not pay any more for a pig if it is high in carbon." The rule of thumb practice in "grading" foundry irons is based on the supposed carbon contents, and as ordinary foundry irons, regardless of "grade," contain enough carbon for all purposes, the difference in price paid for No. 1 and No. 2 irons is often just that much premium paid to the blast furnacemen without receiving the benefit of any corresponding value in quality of iron. It would be interesting to know what is really (and honestly) meant by a "standard" brand of iron, and I defy anybody to give a satisfactory definition of this precious product. It should be noticed that Mr. Keep himself states that "any marketable iron can be used if properly mixed with other marketable irons." If any marketable irons will do for stove work, they will certainly do for less particular work also. Our foundrymen have been long complaining that there is little or no profit in the foundry business, and it is a wonder to me that

there can be any profit at all coming to such founders as are still clinging to their pet "grading" by fracture, and who are paying premiums on irons simply because they have an open grain, which has been proven to be a "delusion and a snare." Blast furnacemen, in trying to show that the rule of thumb method in grading irons is not quite so arbitrary as supposed to be, have succeeded in proving just the reverse, and that analysis is the only reliable guide when purchasing irons. When a blast furnaceman has the courage to admit in print that his precious No. 1 and No. 2 carry the same amounts of silicon as his No. 3, there is no more "telling" evidence needed for proving the "fake" that is practiced upon unsuspecting founders. And when he further states that the three grades are obtained in the same casts he also admits that they stand him at the same cost of manufacture.

An amusing statement of Mr. Keep is the one that "chemical analysis is too slow and too expensive for a foundry making casts every day." This statement is the more amusing as it comes from a member of a craft one member of which recently said that "though all other branches of the iron and steel business have been revolutionized, the foundry business is plodding along in the same old rut, and is governed by the rule of cut and try." And he could not see that there had been any improvement in it for the past 40 years. These are pretty strong statements, coming, as they do, from an "old-timer." As to the expenses for chemists' services, I would say that I know of some chemical "Nancy Hanks" born and bred in our own United States who assure me that they are able to rattle off some 50 to 75 determinations per day. There is certainly nothing slow about these artists, and their services can be had at incredibly low figures. These champions, however, are not the ones that would be of any use to the founder. Considering the small number of determinations really needed for a foundry, one expert will suffice for 25 ordinary foundry shops.

Mr. Keep says: "Chemists often say, what is perfectly true, that neither foundrymen nor furnacemen know what chemical constitution is required to make the best castings." Nobody has disputed this fact. If the furnacemen and founders do not know anything about it by this time, it shows that they have neglected to follow up the literature on this subject and that the columns of *The Iron Age* have not been perused as they should be. And it is not necessary that they should have any knowledge upon this subject. Entrust the beginning to experts, and by degrees the little metallurgical knowledge required will be picked up by the foundryman, and he will soon be able to judge for himself what irons will fill the bill at the least cost. Any furnace will in the near future have to furnish the per cent. of silicon in their irons, and this can be easily done within the limits of 0.5 per cent.

It is well known that wrought iron and steel have of late been largely substituted for cast iron for building purposes. In his work, "Materials of Construction," Thurston states that "cast iron columns are economical in cost of manufacture and of fitting, and are more durable when exposed to the weather than are columns of wrought iron." Yet engineers and architects tell me that they prefer using wrought iron or steel, because cast iron cannot be relied upon. Now, there need be no more

unreliability about cast iron than about wrought iron and steel. As, however, engineers seem to be less familiar with the real capabilities of cast iron than with those of wrought iron and steel, the manufacturers of the former products have not been "kept up to the scratch," by being compelled, because of rigid specifications, to aim at the best results. By aiming at a minimum tensile strength of 25,000 pounds per square inch the probability is that better results still will be obtained; and I know that such results are obtained regularly at a foundry where the rule of thumb practice does not prevail and where they are able to use up all the scrap they care to.

Any manufacturer who neglects to avail himself of the aid of science, where applicable, will, sooner or later, find himself left behind; and in no branch of industry is this more apparent than in our great iron industry, the immense strides of which are in a large measure due to scientific research and prompt application of the results.

WM. MOLIN.

NEW YORK, February 17, 1894.

## Washington News.

(From our Special Correspondent.)

WASHINGTON, D. C., February 27, 1894.

The following is an abstract of the official report of a test of 10-inch Wheeler Sterling armor piercing projectiles on February 17, 1894: Gun used, 10-inch breech loading rifle. Mount, Amphitrite's hydraulic recoil. Plate, Monadnock's second half curved 11½-inch nickel steel plate previously attacked by two 8-inch armor piercing projectiles in test of plate. Distance between gun and plate, 320 feet; line of fire normal to plate at points of impact. Charge, first round, 144.2 pounds; second round, 139.75 pounds. Striking velocity, both rounds, 1400 f. s.; striking energy, both rounds, 6802 ft. tons.

Round 1.—10-inch armor piercing projectile, 500 pounds, hardened 3 inches below bourrelet, struck plate 24 inches from top, 119 inches from left edge, 2 inches to right of middle of plate. Penetrated plate and 5 inches of the backing, rebounded 85 feet entire and uncracked. Plate cracked from top to bottom, through impact opening 2 inches wide at top and 1½ at bottom; nine armor bolts broken, fringe 2½ inches high, bulge front 30 inches diameter.

Round 2.—Projectile and conditions same as round 1. Striking velocity, 1400 f. s.; striking energy, 6802 ft. tons. Shell rebounded entire and symmetrical and uncracked, with slight marks of rifling on bourrelet. In spinning around after rebounding the extreme point was broken off by striking the railroad track. This impact broke the right hand half of plate into three pieces. One piece, weighing over a ton, just above these two impacts, was thrown into the air and landed behind the backing; portion under these two impacts remained standing.

The portable furnace designed by William Sellers for the placing of the jackets at a high state of heat on the tubes of the guns being manufactured at the Washington Naval Arsenal has been completed and will shortly be tried.

The process is entirely experimental at present. The furnace and jacket are held in position at a high degree of



heat while the tube, kept cold by a stream of water, is inserted.

If the process succeeds it will be an important advance in the assembling of great guns of this design and fabrication. It must be admitted that experts are not very sanguine; therefore if successful the greater will be Mr. Sellers' triumph.

## MANUFACTURING.

### Iron and Steel.

The Scottdale Iron & Steel Company, Limited, Scottdale, Pa., have made a proposition to their puddlers to return to work at \$4 per ton, and have promised steady employment if the offer is accepted. The matter is now being considered by the puddlers, with every probability of the proposition being accepted.

Several days ago representatives of the Johnson Company, Johnstown, Pa., were in Youngstown, Ohio, examining different sites in that city with the view of locating the plant of the Johnson Company at that place, and which will probably be removed from Johnstown, Pa. In addition to the proposition to move the plant it is proposed to erect another rail mill, enlarging the plant to twice its present size, and also increasing the output accordingly. The aggregate value of the proposed plant is placed at \$3,000,000. The Board of Trade of Youngstown, Ohio, have already taken up the matter of securing this enterprise, and in all probability an offer of suitable ground, with a cash consideration, will be made.

Frank L. Slocum of Pittsburgh denies that he is interested in any way in the suit brought by James Tod against the Sterling Steel Company and C. Y. Wheeler of Pittsburgh. He states that the use of his name in the suits was unauthorized and without his knowledge.

The Diamond Steel Company, Reading, Pa., who were incorporated several months ago for the manufacture of high grade crucible steel, are meeting with every encouragement. They are erecting an addition to their present plant of 60 x 175 feet, which they will equip with several hammers, two complete trains of rolls—one 12 inches and one 14 inches—and other machinery at a cost of about \$20,000. The above addition will more than double their present capacity. The plant is under the direct supervision of their general manager, Walter Steel. They have some large orders in hand which will keep them busy for some time.

John H. Bass of Fort Wayne, Ind., the great car wheel manufacturer, has just completed a large new car wheel works at Lenore, Tenn., for the manufacture of cast iron car wheels for the Southern railroad trade. The foundry and finishing shops will employ 300 men when run to full capacity.

A general strike of the hands of the Colorado Fuel & Iron Company, at Pueblo, Col., was averted on the 21st ult. by the action of the men employed in the converting department. They decided to accept a reduction of 46 per cent. in the tonnage scale which had been made by the management. Employees in other departments are confidently expected to follow their example.

The Illinois Steel Company have blown in one of their blast furnaces at South Chicago. This is the first sign of life at this great plant and leads to the hope that ere long the entire works will be in operation.

It is reported that the Reese Iron & Steel Company of Tonawanda, N. Y., will begin work on their plant about March 1. The plant, when completed, will cover about 8 acres and its cost will exceed \$100,000. Its location is on the bank of Two Mile Creek, about 1 mile from the canal, in South Tonawanda. The company propose to make the creek navigable as far as their plant and to build docks along the banks.

Receiver William Keenan of the Troy, N. Y., Steel & Iron Works, says that the steel manufacturing portion of the plant will resume operations in full Monday, March 5, and 125 additional men will be given employment. Several days ago the company received a large order for steel, and the prospect for obtaining others is very good. At present there are many men at work in the steel works making re-

pairs and getting everything in readiness for increased operations. The steel works have been in idleness since last May, and many of the former employees have removed to other cities to obtain work.

The partnership heretofore existing between W. P. Townsend, Chas. C. Townsend and Edward P. Townsend, under the firm name of W. P. Townsend & Co., New Brighton, Pa., manufacturers of rivets, has been dissolved by the retirement of W. P. Townsend. The remaining partners will continue the business under the name of C. C. & E. P. Townsend.

The Thomas Iron Company, Hokendauqua, Pa. announce a reduction in wages of 10 per cent., to take effect March 1.

The steel and billet mills of the Bethlehem Iron Company, at Bethlehem, Pa., resumed work on Monday on orders that will keep the employees at work for two weeks.

At Chas. L. Bailey & Co.'s puddling mills, Harrisburg, Pa., notice has been given of a reduction of 50 cents a ton.

The Monongahela Iron & Steel Company of Pittsburgh, manufacturers of muck bars, are advertising for ten puddlers to puddle under the patent process controlled exclusively by this firm. The old employees refused to work strong iron at rates proposed by the firm, which proposition was then withdrawn. The men were offered \$4, \$5 and \$6 per ton for the common, strong and extra strong iron, respectively, which proposition was declined, as stated above.

Attachment proceedings have been commenced in the Circuit Court at Chicago by the Davis Mining Company of Negaunee, against the Weston Furnace Company of Manistique, Mich. The mining company claim that the furnace company are indebted to them in the sum of \$11,484 for ore supplies.

One furnace of P. L. Kimberly & Co., at Sharon, Pa., will be put in operation during this week.

At Ironton, Ohio, the cut nail factory of the Belfont Iron Works Company is in operation with good prospects for the future. At the same place the cut nail factory of the Kelly Nail & Iron Company is also in operation. The sheet and bar mills of the Eagle Iron & Steel Company, also at Ironton, are in operation to nearly full capacity.

At the annual meeting of the stockholders of the Cleveland City Forge & Iron Company, Cleveland, Ohio, held there last week, the old officers were re-elected, as follows: R. H. Harman, president; L. M. Coe, vice-president and general manager; G. F. Ely, secretary, and R. A. Harman, assistant manager.

The Columbia Corrugating Mfg. Company, Niles, Ohio, have just completed the erection of a factory measuring 60 x 200 feet, and which has been fitted up with improved machinery. This addition to the plant will considerably increase the capacity of the above concern.

The Ashland Steel Works of Ashland, Ky., recently turned out 392 tons of finished steel in one day, breaking all former records made by those works. The usual output is from 275 to 300 tons a day.

A movement is on foot to blow in Charlotte Furnace, at Rochester, N. Y. The object is to make a special low phosphorus charcoal iron.

No. 6 furnace of the Thomas Iron Company, at Hokendauqua, Pa., was blown in last week, making four furnaces at that place in operation.

The annual meeting of the stockholders of the Catsauqua Mfg. Company, Catsauqua, Pa., was held there last week, at which the old Board of Directors was re-elected.

The Edgar Thomson Steel Works, Bessemer, Pa., have been in operation on billets for two or three weeks past. Owing to the fact that large orders for billets are on the books of the concern it has been decided that, for a time at least, the plant will be operated until 12 o'clock Saturday night, and resume operations again on Sunday night following.

A number of puddlers in the employ of A. M. Byers & Co., at Pittsburgh, have signified their willingness to return to work at \$4 per ton for boiling. In view of this, it is probable that a number of furnaces in the puddling department of this concern will be put in operation this week.

Pine Grove Furnace, a charcoal stack located at Pine Grove Post Office, Cumberland County, Ohio, recently made 140 tons

of hot blast charcoal iron in one week, this being the largest product for that period in the history of the furnace.

The plant of the Tyrone Iron Company, Tyrone, Pa., which has been idle more or less for some time past, has resumed operations to nearly full capacity.

At the Homestead Steel Works, Homestead, Pa., all coal and sand used is now received by river, three steam cranes having been erected on the bank of the Monongahela River for the purpose of unloading the coal and sand from the barges into cars, after which it is hauled to the different departments. The converting mill, blooming mill and 40-inch mill of this plant were put on double turn on Sunday night, February 25, this being the first time for several months that these departments have started up on Sunday night. The old 28-inch mill at the above plant will be torn down in the near future and a new mill built in its place. The cranes and tables will be operated by electricity and the capacity of the new mill will considerably exceed that of the present one. As already stated in these columns, the contract for this mill has been given to Mackintosh, Hemphill & Co., Limited, of Pittsburgh.

Cooper, Hewitt & Co. of Trenton, N. J., have made a reduction in the wages of the employees of their New Jersey Steel & Iron Company. The men who have been receiving more than \$1.25 a day are cut 10 per cent. and those receiving that or less 5 per cent. The company state that the works have been run at a loss for more than a year past, and that the present action is taken in preference to shutting down the works.

At the annual meeting of the Midvale Steel Company of Nicetown, Philadelphia, Pa., President Harrah reported that the past year was the most prosperous in the history of the corporation, and that enough orders are now on hand to keep the plant running to its full capacity for the next 14 months. Charles J. Harrah, James F. Sullivan, A. H. Wintersteen, William Sellers, and John Sellers, Jr., were re-elected directors.

The Pottstown Iron Company of Pottstown, Pa., have elected the following officers: Andrew Wheeler, president; Benjamin S. Janney, Jr., vice-president; Charles H. Ashburner, treasurer, and Andrew Wheeler, Jr., secretary.

The Parkesburg Iron Works, at Parkesburg, Pa., have resumed operations with 300 hands. The works have been idle all winter.

Brier Hill Furnace of the Youngstown Steel Company and Grace Furnace of the Brier Hill Iron & Coal Company, both of Youngstown, Ohio, have blown in after being idle for some time.

### Machinery.

Rix & Birrell, engineers and machinery importers, of San Francisco, Cal., are insolvent and have surrendered their assets for the benefit of creditors. The liabilities are \$18,752 and the assets \$11,010.

The Henry R. Worthington Company, manufacturers of steam pumps and hydraulic machinery, have decided to move their business offices, which for the past 50 years have been located in New York, to Brooklyn, and have already begun the erection of a new office building alongside their hydraulic works on Van Brunt street, near Hamilton avenue.

Heath & Sons have completed a new foundry at Lestershire, near Binghamton, N. Y. The foundry is 120 x 40 feet in size, two stories high, and has been built as an addition to their wood working machinery plant.

The old machine shop of the Schenectady, N. Y., Locomotive Works is being demolished to give place to an improved new structure soon to be erected.

Hetherington & Berner of Indianapolis are putting in a line of pneumatic riveting machinery to be used in their department for structural iron work. The addition of these machines to their plant will make it, while not so large as some others, one of the most completely equipped in the country.

Notices of a reduction in wages of 10 per cent. have been posted at the Thomas D. West Foundry, at Sharpville, Pa. This is said to be the second reduction within a month.

The Philadelphia Engineering Company of Philadelphia report, among other orders received by them, one from the Chamberlain Coal Company of Pottsville, Pa., for one of their Corliss winding engines. The

dimensions of the engine are to be 34 inch steam cylinders and 60 inch stroke, and it is to be operated at 125 pounds pressure per square inch. The steam will be generated by a battery of Stirling boilers. The engine will have the standard Philadelphia Corliss liberating valve gear and will be controlled by a sensitive governor of the Porter type. The hoisting drums will be 10 feet in diameter, and 10 feet long, and will be equipped with powerful hand and steam brakes. The adjustment of the lift is to be effected by a toothed gear clutch, thrown in and out with worm gearing. The main shaft bearings are to be 17 inches in diameter, 30 inches long, the body of the shaft between the bearings 19 inches in diameter and the central bearing 19 inches in diameter, 30 inches long. The engine is required to lift an unbalanced load of 50,000 pounds at the rate of 1000 feet per minute. The weight of engine and drums will be about 325,000 pounds.

Warren Webster & Co., with works at Camden, N. J., and Chicago offices at 2 Canal street, report among the many orders received for their Webster vacuum feed water heaters and purifiers one from the Pullman Palace Car Company, Pullman, Ill., for three, aggregating over 5000 horse-power, to equip their entire works. They have also received an order from the same company for the Williams vacuum system of steam heating, in order to utilize waste exhaust steam, without back pressure upon engines, for heating purposes. Previous orders received from the Pullman Company amount to 2700 horse power and cover installations in their plant at Pullman, Ill., during the past four years. Messrs. Webster claim that manufacturers are looking into methods and costs of manufacturing very closely at the present day, and the question of economy in the use of steam leads to many inquiries in regard to their feed water heaters, separators and the Williams heating system. Among recent orders was one for four 14-inch and four 18-inch separators from the Chicago Edison Company of Chicago, Ill. They are about commencing an extension of the factory building which they completed last year. The extension will be 60 x 65 feet, of brick and corrugated iron. When finished it will be fitted with a traveling crane and adapted for use as a wrought iron department. It is expected that the building will be ready for operation in June next.

An answer has been filed by Chas. Davis, president of the Lodge & Davis Machine Tool Company, Cincinnati, in the matter of the application for a dissolution, on the ground that the company have not paid dividends during two of the last three years. The reason given for the failure to pay dividends is that the earnings of the company have been used in perfecting the plant. The assets of the company are given as \$393,358.61, and the liabilities as \$3992.62. The answer states that there is cash enough on hand to pay off the indebtedness. The capital stock of the company was at first \$300,000. It was then increased to \$500,000, but none of the new stock was paid for. Recently the amount of stock has been reduced to \$100,000. It is charged that William Lodge, about a year ago, left the company and connected himself with a rival concern. He was familiar with the company's business, and his action for a time was an embarrassment, but the company, as the answer alleges, have now reached a position where they can make money without him.

The great establishment of Norton Brothers, at 36 to 46 River street, Chicago, was almost totally destroyed by fire on the 19th ult. The firm operate two factories, one of them being at Maywood, in the suburbs of Chicago. The Maywood factory comprises a tin plate works and a department for the manufacture of tin cans on a very extensive scale. The River street factory was devoted to the manufacture of cans to fill special requirements, including japanned and ornamented tin boxes of all kinds. The machinery used was costly, including lithographic presses and numerous special machines built from the firm's own designs. The loss on the building and contents was about \$200,000, fully covered by insurance. As much of the work can be continued at Maywood there will be no serious interruption to the business of the firm.

Hoorn, Bergman & Co. of Fergus Falls, Minn., have begun to manufacture stationary engines in connection with their established foundry and machine trade.

The Wiggins-French Engineering Company have leased the Brodie Foundry, at Little Rock, Ark., and will engage in a

general foundry and machine business. The members of the company are C. P. Wiggins, Jr., M. H. French and R. W. French.

N. P. Bowsher of South Bend, Ind., manufacturer of balancing ways, has purchased the property hitherto occupied by the Colfax Mfg. Company. Some alterations are to be made, after which the plant will be used jointly by the two concerns.

Charles W. Reynolds has completed arrangements for starting a foundry at Champaign, Ill.

Last week the Westinghouse Machine Company of Pittsburgh announced a reduction of 10 per cent. in wages of all employees working by the hour or piece work. The reduction went into effect on Monday, the 26th ult.

The Pittsburgh office of Russell & Co., engine builders, Massillon, Ohio, has recently closed contracts for the following plants: Piedmont (W. Va.) Pulp & Paper Company, one 13 x 18 Russell engine of 100 horse-power; Lyceum Theater, Philadelphia, one 60 horse-power engine; Methodist Book Concern, Pittsburgh, one 35 horse power; O. Spandau of the South Side, Pittsburgh, 45 horse power; James D. Callery, Allegheny, 25 horse-power; village of Plain City, Ohio, two engines of 100 horse power each; Pittsburgh, Corapolis & Neville Island Street Railway, 400 horse-power engines and boilers; Avalon, Pa., 300 horse-power plant for central electric lighting station for Avalon, Bellevue, Ren Avon and Emsworth; Commercial Gazette Publishing Company, Pittsburgh, 35 horse-power engine; Masonic Temple, Pittsburgh, one 35 horse power engine.

The Winship Machinery Company of Atlanta, Ga., have increased their working force, and now have the full force of men at work.

The warehouse of the machine works of Hess, Snyder & Co., at Massillon, Ohio, has been burned, together with valuable patterns, the whole involving a loss of between \$5000 and \$6000.

The Putnam Foundry & Machine Company of Putnam, Conn., will build a new warehouse and pattern room.

The machine shop of J. L. Brown, at Reed City, Mich., has been burned. Loss, \$3000; uninsured.

The Akron Iron Company, Akron, Ohio, have recently taken back a number of employees who were laid off, and the plant is now in operation to nearly full capacity. This concern manufacture charging barrows for foundries and blast furnaces, and are meeting with considerable demand for these goods.

The Lodge & Davis Machine Tool Company of Cincinnati, Ohio, U. S. A., have received an order from the Société Anonyme Cockerill, Seraing, Belgium, for several of their machine tools. The order is a direct outcome of the Lodge & Davis exhibit at the World's Fair, the agent of the Cockerill Company having spent several months at Chicago inspecting the various makes of machine tools.

#### Hardware.

Norwalk Lock Company and Lockwood Mfg. Company of Norwalk, Conn., are working full time.

A 50-foot addition is being built to the shop of the Spencer Automatic Screw Company, Windsor, Conn., to accommodate the increasing business of the company.

The hardware department of the Humason & Beckley Mfg. Company, New Britain, Conn., is now running six days a week.

A contract has been placed with the Winchester Repeating Arms Company, New Haven, Conn., for 35,000 rifles, 20,000 to be sporting rifles and 15,000 for field use.

The St. Louis Stamping Company, St. Louis, Mo., are reported to have reduced the wages of their employees 10 to 15 per cent.

The Shelton Company, Shelton, Conn., have reduced wages from 15 to 25 per cent. for day hands and 15 to 20 per cent. for piece hands.

The Chicago File & Rasp Company have been organized at Chicago, Ill. They will manufacture files, rasps, &c. The incorporators are William Didrickson, T. Pierson and G. Larsen.

The stockholders of the Stanley Rule & Level Company, New Britain, Conn., have elected the following directors: C. L. Mead, T. W. Stanley, J. A. Pickett, H. S. Walter, F. N. Stanley, C. B. Stanley and C. E. Mitchell. The officers elected are as

follows: C. L. Mead, president and treasurer; F. N. Stanley, secretary, and H. S. Walter, superintendent.

The Empire Knife Company, West Winsted, Conn., have closed down their works in view of the refusal of their employees to accept a 15 per cent. cut in wages.

The Hatch Cutlery Company of Middletown, Conn., will move April 1 to Taunton, Mass.

The Davis-Johnson Company have been formed at Chicago, Ill., with a capital stock of \$10,000, to manufacture hardware, &c. The incorporators are Jerome E. Davis, Ira C. Wood and Howard M. Carter.

We are advised by the Levant Emery Company, 280 Broadway, New York, that the Walpole Emery Mills, South Walpole, Mass., for whom they are agents, started up on full time and full crew Monday, February 26. Previous to this date the mills were operated on half time. The Levant Emery Company note a marked improvement in their January business, while February shows a slow but steady advance over January. They expect to see this increase in volume maintained until they get back to something like normal conditions.

Hussey, Binns & Co., Limited, Pittsburgh, with works at Charleroi, Pa., manufacturers of shovels, spades and scoops, have recently made a reduction in wages of their employees. This firm have delayed taking this step until the last moment in the expectation that an improvement in business would come, thus obviating the necessity of making any reduction in wages. However, this expectation has not been realized, and as the firm have been paying their employees full price for such work as they had for them to do, it became absolutely necessary to reduce wages in order to place them on an equal footing with competitors who took this step some time since.

Spencer Hall of Racine, Wis., is purchasing machinery for a bicycle works to be located in that city. A plant will be equipped for turning out high grade wheels.

Hardware Supply Company, Grand Rapids, Mich., are manufacturers of specialties in cabinet hardware, such as Champion spring door catch, patent steel brace for attaching glass frames to bureaus, sideboards, &c., commode bolts, table top fastener, &c. They also do all sorts of small wood turning, such as tool handles, baby carriage ornaments, chair spindles, drawer knobs, &c.

A fire broke out on the morning of the 25th ult. in the factory of the Samuel Winslow Skate Mfg. Company, Worcester, Mass. The building is a four-story brick structure. The total loss by fire and water is estimated at about \$10,000, of which \$3000 is on the building and \$7000 on the stock. The loss is fully covered by insurance.

The affairs of C. Aultman & Co., Canton, Ohio, now in the hands of Wm. A. Lynch, receiver, seem to be progressing toward the reorganization of the company. Heretofore the active management has been in the hands of a few of the stockholders, the balance of the stock being held by estates which paid but little attention to the business. It was deemed advisable that these estates should now take a more active part in the management, and thereupon the stockholders unanimously agreed upon a new directory, which has just been voted in, as follows: Lewis Miller, W. W. Clark, W. R. Day, W. K. Miller and Conrad Schweitzer. It is believed that the new board will take up the question of reorganization in connection with the receiver and submit a plan to the creditors in the near future.

C. & A. Hoffman of Frankford, Philadelphia, manufacturers of butchers' and table steels, report a large demand for their goods from abroad. They are making continuous shipments to France and Germany, and they are in negotiation for shipments to other countries, including Russia and Australia.

On February 16 the Waterbury Brass Company, Waterbury, Conn., moved their entire rolling works into their new mill. After two years' work the company have completed one of the finest brass rolling mills in the country. The building is of iron and brick and is 353 feet long by 152 feet wide. It is practically all under one roof and is well ventilated and lighted, and heated by the Sturtevant system of hot air. The power is furnished by a Harris-Corliss-cross compound engine, located midway of the mill, the rolls being on either side

all in line. Besides this engine they have two horizontal turbine water wheels for driving the shafting. The muffles in the mill are what are called "double enders," and are all set in line parallel with the rolls. All of the machinery used for the various manipulations in the manufacture of brass is new and of the most approved design.

The main building of the plant of the Noble Mfg. Company, Goshen, Ind., was burnt to the ground on the 21st ult. The loss is estimated at \$30,000, with insurance of about \$18,000. The company manufacture a general line of churns, screen doors and step ladders. The works had only started to run full time on the day of the fire, and the blow falls heavily upon the employees, who had been out of work for some time.

Articles incorporating the Racine Hardware Mfg. Company were filed with the register of deeds at Racine, Wis., on the 16th ult. The capital stock is \$175,000. The incorporators are: Chas. F. Hunter, Louis M. Ogden and Martin W. Sherman, all of Milwaukee. The factory will be placed in operation at once.

The Interchangeable Tool Company, who removed from Boonton, N. J., to Utica, N. Y., last November, are now well established at their new location. The plant proper stands on a plot of ground 90 x 240 feet, between Utica and Whitesboro, on the south side of the Erie Canal. They have just commenced running on ten hours, having been operating for some time only eight a day. The plant does all of its own drop forging. The specialties are interchangeable tools, such as nippers, pliers, hand vises, car sealers, joint cutting pliers, telephone nippers with joint cutters and benders combined, and numerous other small tools. They are made in all varieties, from those used by the watch maker to those of the blacksmith. The jaws and cutting edges on the best tools are interchangeable, so that if one is broken or worn out another can be put in its place. The tools are both nickel and oil black finish, and many of them are very ingenious. The plant is heated by a device which uses the exhaust steam from the engine, and a dynamo is being placed for electric lighting. The protection against fire is complete.

Judson L. Thomson Mfg. Company, Waltham, Mass., are remodeling their machinery so as to increase their production about 300 per cent. Where they formerly turned out from 400,000 to 500,000 rivets in 23 hours they expect with the improvements intended to manufacture 1,000,000 rivets in ten hours. A new lacing stud for fine shoes will be added to their present line, which comprises about 250 different styles and finishes.

#### Miscellaneous.

The pipe works of McKee & Milson, at Paterson, N. J., which have been closed for some months, have resumed work with a full force of men.

The large plant of the Porter Iron Roofing & Corrugating Company, which has been located at 101 West Front street, Cincinnati, is to be removed to Anderson, Ind. The final papers were signed on the 11th inst. by the officers of the company and the officials of Anderson in consideration of a small bonus and a factory site. Operations at Anderson by the iron works are to be commenced by May 1. The concern give employment to a large number of men.

The directors of the Barney & Smith Car Company of Dayton, Ohio, have declared a regular quarterly dividend of 2 per cent. on a paid up capital of \$4,500,000. Only a portion of the works are in operation.

The Mather Electric Company of Manchester, Conn., who have recently been re-organized, have elected the following officers and directors: President, M. S. Chapman, manager of the Government Envelope Works of Hartford; vice-president, Thos. C. Perkins, recently associate manager of the Ball & Wood Engine Company's Chicago office; secretary and treasurer, John L. Bunce, recently with the Pope Mfg. Company of Hartford; directors, the above, and Henry A. Redfield, president of the Phoenix National Bank of Hartford; Chas. E. Perkins, Hartford; Chas. M. Jarvis, president of the Berlin Iron Bridge Company, and Norman McD. Crawford, electrical engineer of the Hartford & Wethersfield Railroad Company. The general offices of the company have been transferred from Boston to the factory at Manchester. The company's superintendent and electrical engineer is Thos. Gonet, who has been in charge of the Westinghouse shops at Newark.

## The Iron and Metal Trades.

Reports from Pittsburgh indicate that there have been large sales of Lake Ore to furnaces in that district. It is not clear to what extent the purchases alluded to involve merely a readjustment of prices on Ore not delivered on last season's contracts. The largest producer in the Pittsburgh district is credited with having bought 800,000 tons last week, in addition to 200,000 tons of Pewabic Ore bought earlier. Since the same concern was credited early this year with carrying 500,000 tons the purchase looks very heavy. It is estimated by good authority that the Lake mining companies have contracted to date for about 1,800,000 to 2,000,000 tons. This includes 600,000 tons Chandler, considerable No. 1 Minnesota, Norrie, Aurora and Pewabic. It will be noted that aside from possibly some of the Minnesota Mesaba Ore no sales from that range are reported. Details as to prices have not yet come out, but it is pretty certain that low figures were received.

The Pig Iron markets are pretty quiet, so far as Foundry grades are concerned. Increasing demoralization characterizes the Southern producers, who have a tremendous fight on their hands against the cheaply produced Irons made in the districts which run on Lake Ores and Connellsville Coke.

We note a sale of 5000 tons of warrants to English parties, which carries the total foreign holdings close to 45,000 tons.

The Soft Steel trade is dull and prices are sagging away again. Thus far \$15.60, Pittsburgh, seems to be the lowest price accepted. A good order has been taken in the Chicago district.

It looks as though some one were eager to create the impression that Wire Rods were very scarce. Reports are conflicting, but thus far there is enough material to go around comfortably.

For Finished Iron and Steel the demand is fairly good, but it is yet far from enough to stop the frightful cutting of prices. The discussion as to who are the leaders is somewhat amusing. To the disinterested observer it appears that there is more of the company front than the Indian file about the march.

Among the recent price records made is that of 1¢  $\frac{1}{2}$  lb for Steel Bars at mill, Pittsburgh, a shade under 1.25¢ for Plates at tidewater, a shade under 1¢  $\frac{1}{2}$  lb, delivered, for Car Wheels and 1.35¢ for large contracts for Beams in New York.

Negotiations for a shipment of 1000 tons of Scrap Iron to Glasgow, England, are reported to have fallen through.

The Steel Rail trade continues exceedingly dull, so far as standard sections are concerned. In light sections competition is exceedingly lively and low prices are being made.

## Chicago.

(By Telegraph.)

Office of *The Iron Age*, 50 Dearborn street, 1 CHICAGO, February 23, 1894.

The effects of the great snowstorm and the protracted cold snap which followed it are now being felt severely in the demand for Finished Iron and Steel. The blockading of country roads and the stoppage of outdoor work have cut off a great deal of trade. At all events, this is the only way in which the sudden checking of business is accounted for by dealers generally. They hope that business will improve when the weather becomes better and conditions are more favorable for resumption of operations.

**Pig Iron.**—A fair volume of business is moving in local iron, but the great majority of trades was in small lots, with but a slight sprinkling of good sized contracts. Sales of Southern Iron are still in small quantities only and now run mostly to Nos. 1 and 2 Soft, which are wanted as a mixture with the harder Northern Iron. Lake Superior Charcoal is very quiet with but little inquiry. A blast furnace at South Chicago was blown in last week to supply Pig Iron for Joliet. Another stack may follow this week. Quotations are given as follows, for cash:

|                                 |           |         |
|---------------------------------|-----------|---------|
| Lake Superior Charcoal.....     | \$15.30 @ | \$15.50 |
| Local Coke Foundry, No. 1....   | 12.00 @   | 12.50   |
| Local Coke Foundry, No. 2....   | 11.50 @   | 12.00   |
| Local Coke Foundry, No. 3....   | 11.00 @   | 11.50   |
| Local Scotch.....               | 13.00 @   | 13.50   |
| Ohio Strong Softeners No. 1.... | 13.50 @   | 14.50   |
| Southern Silvery, No. 1.....    | ..... @   | 12.50   |
| Southern Silvery, No. 2.....    | ..... @   | 11.75   |
| Southern Coke, No. 2.....       | 11.50 @   | 11.85   |
| Southern Coke, No. 3.....       | 11.00 @   | 11.50   |
| Southern, No. 1, Soft.....      | 11.50 @   | 11.85   |
| Southern, No. 2, Soft.....      | 11.00 @   | 11.50   |
| Tennessee Charcoal, No. 1....   | 16.00 @   | 16.50   |
| Tennessee Charcoal, No. 2....   | ..... @   | 15.00   |
| Southern Gray Forge.....        | 10.60 @   | 10.85   |
| Alabama Car Wheel.....          | 18.50 @   | 18.65   |
| Jackson County Silvery.....     | 15.00 @   | 16.00   |
| Other Ohio Silvery.....         | 13.00 @   | 13.50   |
| Coke Bessemer.....              | 12.00 @   | 12.50   |

**Bars.**—Trade is reported extremely dull by all classes of sellers, including both manufacturers and dealers. A few inquiries are in the market, but the transactions are very light. Prices are no better, and while nearby mills are quoting 1.15¢ @ 1.20¢ on Bar Iron, these rates are by no means firm. The valley mills continue to quote 1.10¢ at mill, or 1.23¢, Chicago. Soft Steel Bars, mill shipment, are now quoted at 1.30¢ @ 1.40¢, Chicago, but the price depends on specifications, and the outlook seems to be in favor of lower rates. Jobbers report about the worst condition of business they have experienced during the depression. They are securing some orders by special effort, but consumers are taking only small quantities, and even on these are shopping vigorously. Small lots are quoted at 1.35¢ @ 1.40¢ on Bar Iron, and 1.35¢ @ 1.50¢ on Soft Steel Bars.

**Structural Material.**—An erroneous announcement was made in these columns regarding the Milwaukee viaduct, which was reported to have been taken by Pittsburgh manufacturers. The contractor who received the award was C. L. Strobel of this city and he has arranged for the material with the Illinois Steel Company. The quantity involved is very close to 3000 tons, which includes a fine lot of Beams. Bridge work is moderately good, but business is confined to small work. The outlook for building continues to grow better, but actual contracts are not yet being made to any extent. Quotations at present are as follows for Chicago delivery:

Beams and Channels, 1.40¢ @ 1.45¢; Tees, 1.75¢ @ 1.80¢; Angles, 1.35¢ @ 1.45¢; Universal Plates, 1.40¢ @ 1.50¢. Small lots from stock are sold at an advance of 10¢ @ 15¢ @ 100 above these prices.

**Plates.**—A great deal of figuring is now going on, but business is slow to come to a definite point. A notable feature of the trade in this line is the great increase in work arising from the construction of water works. An unusual number of stand pipes are now in the market, and are the subject of vigorous competition among the Tank makers. Prices are continued as quoted last week, but on large lots these quotations can be shaded. Mill shipments, Chicago delivery, are quoted as follows: Tank Steel, 1.40¢ @ 1.50¢; Flange Steel, 1.80¢ @ 1.90¢; Fire Box, 2¢ @ 5¢. Store prices are as follows: Iron or Steel Sheets, Nos. 10 to 14, 2¢ @ 2.10¢; Tank Steel, 1.80¢ @ 2¢; Flange Steel, 2.15¢ @ 2.35¢; Boiler Tubes, 70 and 10 % off.

**Sheets.**—Manufacturers of Black Sheets are soliciting business more keenly than ever, and exceptional inducements are being offered to buyers to place their contracts for the season at this time. Quotations on mill shipments of No. 27 Common are 2.40¢ @ 2.50¢, Chicago, with small lots from stock selling at 2.70¢ @ 2.75¢. The business in Galvanized Iron is extremely dull, as consumers are holding off in the expectation that prices may go lower. This is rather doubtful, as manufacturers are now discriminating on the list and some are refusing to take any business whatever on heavy gauges. They claim that it is a waste of time and trouble to galvanize Sheets, and therefore would prefer to sell them as Black Sheets, rather than put them through the galvanizing process. Quotations on mill shipments of Juniata are openly made at 75 and 10 and 5 % off, while small lots from stock are quoted at 75 % off. Quotations on Sheet Copper are continued at 30 % @ 35 % off for Light Sheets, and up to 40 % off for Heavy Sheets, according to quantity.

**Merchant Steel.**—The past week has been quiet in this line. Specifications are coming in well on old contracts, but new business is slow. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery, Tire and Open Hearth Spring Steel, 1.85¢ @ 1.95¢; Ordinary Bessemer Machinery, 1.55¢ @ 1.60¢; Bessemer Tire, 1.40¢; Ordinary Tool Steel, 6¢ @ 7¢; Specials, 12¢ and upward.

**Billets and Rods.**—A sale of 6000 tons of Billets for April, May and June delivery is reported, but trade may now be quiet for some time, although considerable tonnage is in prospect which should be closed within the next three months. Prices range from \$18 to \$18.50. Wire Rod mills are full of work, and have no part of their output for sale earlier than July 1, but refuse to quote on later deliveries. Nominal quotation is \$25, which means nothing under the circumstances with no supply of Rods available.

**Rails and Track Supplies.**—Nothing new has transpired in Steel Rails; orders are coming in very slowly. The starting up of a blast mill at South Chicago is no indication of an early start of Rail mills there, as the Pig Iron made is to be shipped to Joliet works. Prices of standard Rails are still quoted at \$25 @ \$27, according

to quantity. Splice Bars are quoted at 1.40¢; Track Bolts with Hexagon Nuts, 2.40¢ @ 2.45¢, and Spikes, 1.75¢ @ 1.80¢.

**Scrap.**—An extremely light demand is reported for Old Material. Quotations in a regular way per net ton are as follows: No. 1 Forge, \$8.50 @ \$9.50; No. 1 Mill, \$6.50 @ \$7; Pipes and Flues, \$6; Heavy Cast, \$7.50 @ \$8; Stove Plate, \$5.50 @ \$6; Fish Plates, \$10; Cast Borings, \$3.50; Wrought Turnings, \$5; Mixed Steel, nominally \$5.25.

**Old Rails and Car Wheels.**—The only transaction in Old Iron Rails is one of 2000 tons at private terms. Quotations based on the present attitude of buyers and sellers would seem to range from \$11 to \$12. Consumers take a very bearish view of the situation, and some predict that Rails will sell within 60 days at \$9. An offer of \$7.25 was received for a lot of Mixed Old Steel Rails. Quotations are continued at \$9.50 @ \$10 for long lengths, and \$6.75 for short pieces. Old Car Wheels have been quiet at \$10 @ \$10.50.

**Metals.**—Lake Copper has not gained in strength, and carload lots are still quoted at 10½¢. Casting Copper has receded to 9.50¢. Spelter stands at 3.60¢ @ 3.62½¢. Pig Lead is a trifle stronger at 3.10¢.

Rogers, Brown & Merwin, Monadnock Block, Chicago, have been appointed sales agents for the Rome Iron Company of Rome, Ga., manufacturers of Car Wheel Pig Iron. Analyses of this Iron show only a trace of sulphur, while the phosphorus is also very low. It ranks equal to the best of the old brands of Southern Car Wheel Irons.

A new metal brokerage firm has been established under the name of the Western Metal Company, whose office is located in room 316 Western Union Building, Chicago. The manager is W. C. Carpenter, who enjoys a wide acquaintance among both producers and consumers. The company will make Spelter and Pig Lead their specialties.

## Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., February 27, 1894.

Business during the past week has been one of extreme monotony in the Iron and Steel trade, and, on the whole, not as satisfactory as during several weeks immediately preceding. In spots prices are weaker, and as there has been no increase in the demand, the outlook for the near future is not inspiring. Mills and foundries that are in operation are averaging from four to five days per week, although some that usually contribute a good deal of business are doing nothing at all. The extremely bad weather may have in some measure delayed the placing of orders, and there is a general impression that after the turn of the month things may again take a new start. Tariff legislation will doubtless prevent any very heavy movement, but there is a reasonable probability of some increase in the volume of business, although not much hope of better prices. Competition from the West is as vigorous as ever, and as they seem determined to take the business without much regard to prices manufacturers hereabouts are inclined to let them have it wherever the material is offered below cost. Inquiries seem to be more numerous, how-

ever, and of a more varied character than we have seen for a long time past, and as many of them appear to have business behind them, it is hoped that they will soon develop into something definite. Meanwhile, immediate work is wanted, and when that can be offered prices will be made as satisfactory as any one could desire.

**Pig Iron.**—The demand is fairly in line with the supply. It has not increased as rapidly as was hoped, but it holds its own, and there is some reason to believe will begin to show improvement in course of the next three or four weeks. Prices are very low, and while they are pretty well held, there is not much chance of improvement until consumption reaches larger proportions than at present. This feeling is so general that both buyers and sellers accept the situation as one likely to continue for some time to come, hence there is no urgency either to buy or sell beyond what is necessary to keep things moving. Prices are more uniform than they have been for a long time past, 50¢ @ ton being about the extreme range in any of the grades; that is to say, \$13 being about a very inside figure for No. 1 Foundry, and \$13.50 the extreme outside. General quotations for Philadelphia and equivalent points are about as follows:

|                           |           |         |
|---------------------------|-----------|---------|
| No. 1 Foundry .....       | \$13.00 @ | \$13.50 |
| No. 2 Foundry .....       | 12.25 @   | 12.75   |
| Standard Gray Forge ..... | 11.25 @   | 11.50   |
| Ordinary Gray Forge ..... | 10.75 @   | 11.00   |

**Steel Billets.**—There is not much business to report, the demand having been pretty well satisfied at the low prices ruling during the early portion of January. Prices are working down, however, and consumers are beginning to consider what figures to bid for good sized lots, as they will need to replenish in the course of the coming month. Asking prices are \$18 @ \$18.25, but actual selling prices would be below \$18 for good sized lots, and possibly pretty close to \$17.50 on the right kind of an order. Business is under negotiation, but buyers require low figures to induced any but hand to mouth purchases.

**Finished Material.**—The remarks made in recent reports would be equally correct if applied to to-days market—and there is really nothing more or less to be said. Business keeps fairly in line with what it has been during the past several weeks; there is no appreciable gain, neither is there any falling off, although so large a proportion goes to Pittsburgh that some of the local mills are doing less than during the earlier portion of the month. This is specially the case in the Sheet and Light Plate trade, which is very much depressed, manufacturers finding it impossible to meet quotations made by their Western competitors. In one shape or another there is a good deal of work around, and if it comes out as expected, several thousand tons of Light Plates will be placed, besides a moderate amount of heavy work. Some business has been done with the shipyards, and additional orders are under negotiation, but at extremely low figures, 1.25¢, if not less, having been accepted on one 500-ton lot that was closed yesterday. Small orders are numerous, and as comparatively good prices are realized, mills that cultivate that class of trade are doing pretty well. General quotations are about as follows, but on large lots liberal concessions can be had:

|                                |         |       |
|--------------------------------|---------|-------|
| Grooved Skelp, delivered ..... | 1.25¢ @ | 1.30¢ |
| Best Refined Bars .....        | 1.30¢ @ | 1.40¢ |
| At interior points .....       | 1.15¢ @ | 1.20¢ |
| Tank Steel .....               | 1.30¢ @ | 1.40¢ |



|                         |       |         |
|-------------------------|-------|---------|
| Heavy Plates.....       | 1.35¢ | @ 1.45¢ |
| Shell.....              | 1.50¢ | @ 1.60¢ |
| Flange.....             | 1.70¢ | @ 1.90¢ |
| Angles.....             | 1.50¢ | @ 1.60¢ |
| Beams and Channels..... | 1.60¢ | @ 1.80¢ |

**Old Material.**—With more inquiry, it begins to look as if the market would do better, particularly as stocks seem to be lighter than was supposed. Borings and Turnings are very scarce, indicating a light business at the large machine shops. On the whole, the tendency ought to be toward better prices, but in the meanwhile quotations are about as follows:

|                          |         |           |
|--------------------------|---------|-----------|
| Heavy Melting Steel..... | \$10.00 | @ \$11.00 |
| Light Melting Steel..... | 8.00    | @ 9.00    |
| No. 1 Wrought Scrap..... | 10.50   | @ 11.50   |
| Machinery Cast.....      | 9.50    | @ 10.50   |
| Wrought Turnings.....    | 9.00    | @ 10.00   |
| Cast Borings.....        | 6.00    | @ 6.50    |
| Old Iron Rails.....      | 12 50   | @ 13.00   |

## Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building,  
Pittsburgh, February 27, 1894.

The month of February, which started in so auspiciously, has not kept up its gait, the volume of business showing considerable falling off within the last week or two. Prices, too, are somewhat easier, especially on those products on which advances took place early this month. Just now the market seems to be in a waiting attitude, buyers believing that by holding off they will be able to discount prices ruling to-day, while, on the other hand, the mills are better supplied with work than they have been for some time past, and until much of this has been worked up it is not likely that sales will be forced to any extent. While the situation is not as encouraging as it was early this month, at the same time the mills have more work and the tonnage in Finished Material is considerably larger, but prices are no better; on the contrary, are slightly lower. From Cleveland comes the information that additional Ore purchases were made last week, but the information so far received is very meager and indefinite.

**Pig Iron.**—The same discouraging condition of the Pig Iron trade noted for the past two or three weeks continues, and prices are showing a weaker tendency. The recent sales of Ore on the basis of \$2.75, Cleveland, have undoubtedly influenced the market in the direction of lower prices. The demand, which has been so light for some time past, has also done its share toward bringing about the weakness in prices. Pig Iron makers claim that taking Ore on the basis of the recent sales at Cleveland, and figuring Coke at 90¢ per ton and labor at 20% reduction over a year ago, they will not be able to sell Pig Iron at less than present ruling prices and come out whole. The market continues to be characterized by purchases of hand to mouth character, no large blocks being in negotiation and none are expected until the market is more settled. The list of active furnaces has been increased by the addition of one stack in the Shenango Valley, which resumed yesterday. Several lots of Gray Forge Iron are under negotiation and may be closed this week. Foundry Iron is in fair demand, inquiries being better than for some little time past. We quote the market as follows:

|                         |        |                |
|-------------------------|--------|----------------|
| Neutral Gray Forge..... | \$9.65 | @ \$9.75, cash |
| All-Ore Mill.....       | 9.75   | @ 10.00        |
| No. 1 Foundry.....      | 12 00  | @ 12.25        |
| No. 2 Foundry.....      | 10.75  | @ 11.00        |
| Bessemer.....           | 10.50  | @ 10.65        |

**Billets.**—The Steel market continues extremely quiet, very few sales having taken place during the week, and these being for small lots only. As stated last week, the mills are fairly well fixed with business for the next two or three months, and are not inclined to take orders at any price that may be offered. Pittsburgh makers are quoting \$15.75 @ \$16, according to order. It is stated that outside mills have offered to shade our lower quotation to slight extent. The Edgar Thomson Mill has been on Billets for two or three weeks past, and is turning out about 1200 tons every 24 hours.

**Plates and Sheets.**—Compared with a month ago the tonnage is slightly larger, although prices are no better, but slightly lower. Considerable Tank Steel is being sold at the present time, and a number of inquiries are in the market that represent considerable tonnage. We have reduced quotations slightly on Tank Steel and quote as follows: Tank Steel, 1.20¢ @ 1.25¢; Shell, 1.35¢ @ 1.45¢; Flange, 1.50¢ @ 1.60¢; Ordinary Fire Box, 1.75¢; Railroad Fire Box, 2¢. Business in Sheets continues light, and with the mills anxious for business, prices are correspondingly lower. We quote Common Iron Sheets as follows: No. 24, 2.20¢; No. 26, 2.30¢ and No. 27, 2.40¢ at mill. Some makers charge a slight advance on these prices for Soft Steel Sheets, while others make no distinction.

**Ferromanganese.**—The demand is light and we continue to quote \$52, delivered, for 80% domestic.

**Structural Material.**—Makers report inquiries as being plentiful, but actual business does not show any gain in tonnage. A great deal of figuring is being done on prospective work and the outlook, as far as demand is concerned, is very encouraging. Prices show no change and we quote as follows: Beams and Channels up to 15 inches, 1.25¢ @ 1.35¢, according to order; Angles and Universal Plates, 1.25¢ @ 1.30¢; Tees, 1.40¢ @ 1.50¢.

**Muck Bars.**—Demand continues light, and we repeat quotation of \$19.50 @ \$20 delivered at buyer's mill. Now that \$4 has been established as the price for puddling in the Pittsburgh district, it is not improbable that Muck Bar will show a corresponding decline in price.

**Bars.**—The volume of business does not show any gains, although inquiries are reported as being slightly better. With so many mills in operation, and all of them anxious to get as much business as they can, it naturally follows that attractive prices are made, which in some cases are said to be considerably below cost of production. Some very low prices have recently been made on Common Iron Bars, while Soft Steel Bars are being held with a firmer tendency. Valley mills continue to quote Iron Bars at 1.10¢ @ 1.15¢, according to order. Soft Steel Bars may be quoted at 1.20¢ @ 1.30¢. It would doubtless require a very desirable order to shade our lower quotations.

**Merchant Steel.**—The improved demand from jobbers noted last week continues and a fair amount of material is moving. Some delayed specifications have also come in within the last week, and altogether the situation is considerably improved. Prices do not show any material change and we continue to quote as follows: Bessemer Machinery, 1.40¢ @ 1.45¢; Open Hearth Machinery, 1.60¢ @ 1.70¢; Open Hearth Spring, 1.70¢ @ 1.75¢; Toe Calk, 2¢; Machine Straightened

Tire, 1.60¢ @ 1.65¢; Sleigh Shoe, 1.65¢; Cold Rolled Shafting, 1.65¢ base.

**Skelp Iron and Steel.**—There is an improved demand for Skelp Steel, but prices are as low as ever. Iron Skelp is also looking up in demand, and it is estimated that slightly higher prices will likely prevail in the near future. We continue quotations as follows: Grooved Steel Skelp, 1.05¢ @ 1.15¢; Sheared Steel Skelp, 1.15¢ @ 1.25¢; Grooved Iron Skelp, 1.25¢ @ 1.30¢; Sheared Iron Skelp, 1.35¢ @ 1.40¢.

**Wire Nails.**—The established price of \$1.05 in carload lots at mill for Wire Nails is being maintained. As stated last week, the demand has fallen off to some extent recently, but owing to large orders booked some time ago, the mills are well fixed for the next two or three months. In Cut Nails the situation is also considerably improved, most of the mills having a fair run of orders, with prices ruling at \$1 and \$1.05 in carload lots at mill for the usual averages.

**Barb Wire.**—The demand is principally for small lots, the large buyers having satisfied their requirements some time since. The established prices of \$2.15 for Four-Point Galvanized and \$1.75 for Painted in carload lots, at mill, are being observed. Plain Wire is ruling at \$1.35, in carload lots at mill.

**Connellsville Coke.**—For the week ending Saturday, February 17, there were 9780 ovens in the Connellsville region in blast and 7733 idle, with a total estimated production for the week of 95,899 tons. Compared with the production of the previous week this was a net increase of 4214 tons and a net gain in active ovens of 544. Furnace Coke continues to rule at 85¢ at oven in tons of 2000 lb. Foundry Coke is held at \$1 to dealers and \$1.15 to consumers, the latter quotation being shaded about 10¢ per ton for desirable orders.

O. M. Hartzell & Co. of 15 Sixth avenue, Pittsburgh, are offering Tungsten Metal, 95% @ 98% guaranteed; Manganese Metal, 92% @ 93% guaranteed; 80% @ 85% Chrome Metal, and 40%, 50% and 60% Chrome Metal. They also sell 70% Wolfram Ore.

## Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts.,  
CINCINNATI, February 28, 1894.

The general feature of the Pig Iron market is weakness, and it is evident that round lots of Southern Coke Iron could be bought at lower prices; there have been sales of 2000 tons No. 2 Soft Foundry Iron at \$7, f.o.b. Birmingham, and for No. 2 regular it is said that \$7.25 has been shaded, in fact, the whole market for Southern Foundry Coke Iron is so much demoralized that there appears to be no settled prices, but it is strongly asserted that a reduction of fully 25¢ per ton could be obtained on all grades. There is rather more demand for small lots from the jobbing foundries, the orders being more frequent and for increased quantities, more frequently running up to 100 to 200 tons, but the aggregate volume of business is still so small as to discourage furnacemen and their agents. There is some improvement in the demand from the East, but it is not large. There is not much demand



for Charcoal Iron, but the better qualities of standard Car Wheel Iron are firmly held. Quotations are merely nominal, as follows:

#### Foundry.

|                                   |           |         |
|-----------------------------------|-----------|---------|
| Southern Coke, No. 1.....         | \$11.00 @ | \$11.25 |
| Southern Coke, No. 2.....         | 10.00 @   | 10.25   |
| Southern Coke, No. 3.....         | 9.50 @    | 9.75    |
| Ohio Soft Stone Coal, No. 1.....  | 14.50 @   | 15.50   |
| Ohio Soft Stone Coal, No. 2.....  | 14.25 @   | 14.50   |
| Lake Superior Coke, No. 1.....    | 13.00 @   | 13.50   |
| Lake Superior Coke, No. 2.....    | 12.00 @   | 12.25   |
| Hanging Rock Charcoal, No. 1..... | 17.00 @   | 17.50   |
| Hanging Rock Charcoal, No. 2..... | 16.50 @   | 17.00   |
| Tennessee Charcoal, No. 1.....    | 13.50 @   | 14.00   |
| Tennessee Charcoal, No. 2.....    | 12.50 @   | 13.00   |

#### Car Wheel and Malleable Irons.

|                                            |         |       |
|--------------------------------------------|---------|-------|
| Standard Southern Car Wheel                | 16.75 @ | 17.75 |
| Lake Superior Car Wheel and Malleable..... | 16.50 @ | 17.00 |

#### Forge.

|                   |        |      |
|-------------------|--------|------|
| Gray Forge.....   | 9.00 @ | 9.25 |
| Mottled Coke..... | 9.00 @ | 9.25 |

## St. Louis.

(By Telegraph.)

Office of The Iron Age,  
Bank of Commerce Building,  
St. Louis, February 28, 1894.

**Pig Iron.**—The past week has been a repetition of the previous one with the exception that prices are perhaps a trifle weaker. Sales during the week were extremely light, the heaviest order not running over 200 tons. Consumers are practically naming their own prices, which are generally acceded to by the agents. We quote as follows for cash, f.o.b. cars St. Louis:

|                                   |           |         |
|-----------------------------------|-----------|---------|
| Southern Coke, No. 1 Foundry..... | \$11.75 @ | \$12.25 |
| Southern Coke, No. 2 Foundry..... | 10.75 @   | 11.00   |
| Southern Coke, No. 3 Foundry..... | 10.25 @   | 10.50   |
| Southern Gray Forge.....          | 9.75 @    | 10.00   |
| Southern Car Wheel.....           | 17.00 @   | 18.00   |
| Lake Superior Car Wheel.....      | 16.25 @   | 16.50   |
| Ohio Softeners.....               | 1.25 @    | 15.50   |

**Bar Iron.**—The demand fails to show any improvement. Rumors are current of some extremely low prices made by mills for prompt specifications. The general market quotation is 1.20¢, but this would doubtless be shaded \$1 ¢ ton if the order was a desirable one. Jobbers report 1.45¢ @ 1.50¢ for small lots from store, with occasional sales at 1.40¢.

**Barb Wire.**—Jobbers do not appear to be unusually rushed with orders, while mills, on the other hand, have all they can handle. The condition of the Wire Rod market is such that mills are unable to secure Rods for shipment prior to June 1, even by offering a premium. With the supply of Rods practically under control for the next three months the price of Barb Wire is not likely to recede. The market is being shaded by one mill, but as the other mills in this territory have all they can handle the lower price does not influence their trade to any extent. Mills quote \$2.05 for Painted and \$2.45 for Galvanized.

**Wire Nails.**—The better feeling in Barb Wire has not as yet had any influence on Wire Nails. The demand is not heavy and prices are unchanged. Mills quote carload lots to jobbers at \$1.20. Jobbers ask \$1.30 @ \$1.35.

**Rails and Track Supplies.**—No improvement is noted in this department. Railroads are ordering less material than they have done for years, and indications do not point to any immediate revival of business. We quote as follows: Splice Bars, 1.40¢ @ 1.45¢; Spikes, 1.75¢ @ 1.80¢; Bolts, Square Nuts, 2.20¢; with Hexagon Nuts, 2.30¢; Links and Pins, 1.75¢ @ 1.80¢;

Old Iron Rails are practically dead at \$12 @ \$12.50. Steel Rails, \$26 @ \$27.

**Pig Lead.**—The market has apparently settled down to a 3¢ basis and at this price very few sales are recorded. There is no trade worth speaking of, and sales of single carloads represent the condition of the market.

**Spelter.**—This metal is now held at 3.65¢, and there does not appear to be much offering at this figure. The market seems to be in good shape, and with a slight improvement in the demand the price would readily respond. The statistical condition of the market is excellent, but it cannot hold on this alone. At the close to-day the market is firm at 3.62½¢ bid. with 3.65¢ asked.

C. A. Stevenson, local manager for Lee, Chamberlain & Co., successors to Chamberlain, Turney & Baird, advises us that the change in the firm represented by him will have no effect in the office in St. Louis. He will continue to represent Lee, Chamberlain & Co.

## Financial.

While the volume of domestic business does not yet give evidence of any appreciable increase, the tone of the markets has become rather firmer and better during the present week. There has been a decided reaction in the grain market, the price of wheat having advanced several points over the rock bottom figures recorded last week. The position of this product, as well as that of corn and cotton, is more favorable and the markets for all these staples close firm, at this writing, at more or less of an advance. Silver, which fell lower than ever on Friday, has recovered something of its loss and appears likely to climb up again. Speculation in stocks has assumed more activity within the past few days and brokers say that more investment business is being done in securities by the outside public, which has for so long held aloof from Wall street. The active resumption of work in several industries, recorded during the week, although generally on strictly conservative lines, is an additional evidence of the improving feeling, which only needs the stimulus of confidence and certainty in regard to tariff and financial legislation to blossom into the activity for which the financial and commercial communities are sighing.

The average decrease in earnings on the principal railroad lines reporting for the first three weeks of February is smaller than the average declines for January, yet the returns of tonnage in both East and West bound traffic continue to be far from gratifying. In clearing house payments throughout the country the decrease for the week ending last Saturday was 44.6 %, against 37.8 % for the previous week. This comparative decline is, however, accounted for by last week being a broken one, owing to the intervention of a holiday on Thursday.

According to *Dun's Review* the failures during the past week numbered in the United States 288, against 193 last year, and in Canada 51, against 37 last year. Both in number and in magnitude commercial disasters have diminished, and in the first half of February the liabilities thus far reported of all firms failing amount to only \$8,319,698, of which \$3,679,845 were of manufacturing and \$4,559,375 of trading concerns. The aggregate of liabilities was \$9,649,252 in two weeks of January.

That the influx of money to the financial centers still continues is proved by last Saturday's weekly statement of the Associated Banks of this city, which shows an increase in deposits of \$2,750,000, and an actual gain in cash of \$900,000. The loans expanded at the same time by nearly \$2,000,000; the net result being a gain in the surplus reserve of \$230,675, making the amount held in excess of legal requirements \$74,767,000. The statement as a whole indicates that the payments on account of the Government loan have been completed, and that ordinary conditions are again governing the operations of the banks. A number of banks and trust companies are cutting down their rates of interest on deposits, owing to the difficulty experienced by them in finding profitable employment for their surplus cash. This plethora of unemployed money still continues to be a serious burden to the banks of this city, and the weekly additions to the hoard shown in the statements are naturally regarded as unsatisfactory. As it is, New York's national bank circulation is 100 per cent. larger than in previous years at this season. On February 1 the total money circulation of the country was \$25 66 per capita, the highest on record, and an increase of \$1.43 as compared with the total a year ago. The details of the circulation statement of February 1 contain some interesting comparisons. They are as follows:

|                            |                 |      |               |
|----------------------------|-----------------|------|---------------|
| Gold coin.....             | \$327,357,913   | Inc. | \$115,089,848 |
| Silver dollars.....        | 55,735,720      | Dec. | 5,460,668     |
| Subsidiary silver.....     | 61,108,700      | Dec. | 5,442,237     |
| Gold certificates.....     | 77,015,419      | Dec. | 43,630,400    |
| Silver certificates.....   | 330,161,308     | Inc. | 6,968,643     |
| Treasury notes.....        | 15,755,422      | Inc. | 26,528,056    |
| United States notes.....   | 299,378,826     | Dec. | 20,315,312    |
| Currency certificates..... | 44,935,000      | Inc. | 30,485,000    |
| National bank notes.....   | 193,335,220     | Inc. | 23,712,137    |
| Total.....                 | \$1,739,783,511 | Inc. | \$131,825,072 |

Money continues excessively easy. Call loans are nominally 1 %, and time money is quoted at 2 % @ 3 % for 30 days to six months, and 4 % @ 4½ % for longer terms. The demand for time accommodation is said to be a little more active, but the supply continues large. The market for commercial paper remains unchanged. There is a good demand for first-class paper, but little finds its way into the market. Rates are quoted at 3½ % @ 3¾ % for best indorsed, 4 % @ 4½ % for best single names and 5 % @ 6 % for other paper.

Evidence was afforded of a revival of interest in these stocks by the outside public, some substantial purchases for legitimate investment being again noticed. Industrial securities meanwhile declined, Sugar and Lead being especially weak. The market, however, closed firm, with a stronger general tone. The following list gives the extreme fluctuations of a few of the most active stocks during the week ending February 28, with closing prices on that day:

|                             | High-est. | Low-est. | Closing |
|-----------------------------|-----------|----------|---------|
| Am. Sugar Ref.....          | 83½       | 79½      | 82½     |
| Chicago Gas.....            | 63½       | 61½      | 62½     |
| Chic., B. & Q.....          | 77½       | 74½      | 77      |
| Chic., Mil. & St. Paul..... | 59½       | 56½      | 59½     |
| Chic., Rock Isl. & Pac..... | 68½       | 66       | 68½     |
| Gen. Electric.....          | 40½       | 37½      | 40½     |
| Louisville & Nashville..... | 47½       | 45½      | 47½     |
| National Lead, Common.....  | 28½       | 25½      | 27½     |
| New York Central.....       | 100       | 97½      | 100     |
| N. Y. & New England.....    | 11½       | 10½      | 10½     |
| Northern Pacific, Pfd.....  | 18½       | 16½      | 18½     |
| Philadelphia & Reading..... | 21½       | 20½      | 21½     |
| Richmond & West Pt.         |           |          |         |
| Term.....                   | 4½        | 4½       | 4½      |
| St. Paul & Omaha.....       | 36½       | 35½      | 36½     |
| Western Union.....          | 85½       | 83½      | 85½     |

The railroad and general bond market has been strong under a good investment inquiry. There is a steady demand for first-class securities, which has caused their prices to be advanced materially. Second grade bonds are also being bought more freely than for some time past.

Sterling exchange has continued firm and strong, advancing slightly on Tuesday, with a light supply of bills and a good demand from remitters. The Bank of England has reduced its discount rate to 2%. There are, however, as yet no indications of any gold exports. Actual business was done on Wednesday at \$4.86½ @ \$4.87 for 60 days, \$4.88½ @ \$4.88½ for demand, \$4.88½ @ \$4.89 for cables and \$4.85½ for commercial.

Domestic exchange on New York is quoted as follows: New Orleans, commercial 100 premium, bank 150 premium; Charleston, buying par, selling ½ premium; San Francisco, sight 25, telegraph 30 premium; Savannah, buying par, selling ½ premium; Chicago, 30 premium.

Silver fell on Friday to its lowest recorded price both in London and in this country, being quoted in the former place at 27½ pence and in New York at 59½¢ per ounce. The metal has, however, gained an advance during the present week. Wednesday's quotations for bar silver were: London, 27½ pence, and New York, 60½¢ per ounce.

The cold "snap" of the past week has increased the consumption of fuel, and caused some improvement in the anthracite coal trade. The production of this coal is still being radically curtailed. The total output for the week ending February 17 is given as 561,446 tons, compared with 843,212 tons in the corresponding week of 1893. For the year to that date the total tonnage has been 3,899,245 tons, compared with 5,270,448 tons in the corresponding period of 1893, a decrease of 1,371,203 tons.

## Metal Market.

**Pig Tin.**—Prices have undergone a further decline. Prompt deliveries of 5-ton lots were offered at 19¢, net cash, and March delivery at 18.75¢, same terms. Ordinary jobbing parcels were sold relatively as low, or, say, at 19¢ @ 19½¢, according to quantity of Tin involved and terms of payment. The weakness may be attributed chiefly to London depression caused by heavy European stocks of Tin, the unsettled condition of the Silver market and of Eastern exchange. In any event there have been no distinctly "bearish" local features, nor have there been any signs of unusual pressure to sell. The nearest approach to the latter was in distant future deliveries, including August at 16.50¢, and September at 16¢. Lower prices than 19¢, regular terms, seem to be decidedly the exception at this writing.

**Copper.**—The fairly large business referred to last week has had no visible effect upon the general market. In any event nothing more than routine transactions have come to notice, and the almost invariable report is that both home trade and export demand are extremely tame at the moment, while prices remain stationary. The range of quotations is 9.70¢ @ 9.75¢ for Lake Superior Ingot, 9.37½¢ @ 9.50¢ for Electrolytic, and 9.12½¢ @ 9.25¢ for ordinary casting stock, according to brand and quantity.

**Pig Lead.**—Business has been very moderate in this market. Negotiation

has also been tame. In short, dullness stands out prominently as the conspicuous feature. In prices hardly any change has taken place. Sellers rarely went below 3.22½¢ @ 3.25¢, and bids above 3.15¢ have not been exceeded on round lots. The exception was speculative offers of single carloads at 3.20¢, early delivery, on Metal Exchange contracts, and in a few instances on moderate dealings elsewhere.

**Spelter.**—Dealings in this quarter have been very commonplace. The demand has not turned for the better. The offering has reflected no change in the attitude of sellers. In fact, the market has remained flat, showing no response to late reports of contemplated combination of smelters. Good brands may be secured at 3.85¢ @ 3.95¢, according to size of lot and time of delivery. The lowest price was on a few spot carload lots.

**Antimony.**—Of ordinary jobbing quantities there have been fair sales, but supplies are liberal enough to keep prices easy. Hallett's sold at 8½¢, and is quite freely offered at 9¢. Cookson's is quoted at 10¢ @ 10½¢, according to size of lot.

**Nickel.**—The range of 45¢ @ 50¢ is quoted, but few sales, if any, have been made recently at any advance on the inside rate named.

**Tin Plates.**—In some lines of Plates for prompt and early delivery business has increased slightly, but no signs have appeared of anything in the way of general improvement. Forward shipments, while 2½¢ @ 5¢ cheaper than spot goods, have also met with slow sale. For spot goods the following prices are quoted: Coke Tins—Penlan grade, IC, 14 x 20, scarce; J. B. grade, do., \$5.32½ @ \$5.35; Bessemer full weight, \$5.20 @ \$5.25; light weights, \$4.80 @ \$4.85 for 100 lb, \$4.77½ @ \$4.80 for 95 lb, \$4.60 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.45; Siemens Steel, IC basis, \$5.55 @ \$5.60; IX basis, \$6.60. Charcoals—Melyn grade, IC, \$6.35; Crosses, \$7.87½; Allaway grade, IC, \$5.50; Crosses, \$6.65; Grange grade, IC, \$5.60; Crosses, \$6.75. Charcoal Ternes—Worcester, 14 x 20, scarce; do., 20 x 28, \$11.35; M. F., 14 x 20, \$7.25; do., 20 x 28, \$14.50; Dean grade, 14 x 20, \$5.35; do., 20 x 28, \$10.50 @ \$10.60; D. R. D. grade, 14 x 20, \$5.15; do., 20 x 28, \$9.90 @ \$10; Alyn, 14 x 20, \$5.35; do., 20 x 28, \$10.50; Wasters—S. T. P. grade, 14 x 20, \$4.75; do., 20 x 28, \$9; Abercarne grade, 14 x 20, \$4.60; do., 20 x 28, scarce.

## New York.

Office of *The Iron Age*, 96-102 Reade street, }  
New York, February 28, 1894. }

**Pig Iron.**—Current business is light, and competition for orders coming up is very sharp. Eastern Pennsylvania and Hudson River furnaces crowding the Eastern market. A lot of about 1200 tons of No. 2 Northern Iron was sold for delivery near Boston at \$12.15. Albany, Troy and the entire northern part of the State is the battle ground of the Buffalo producers, who are making prices below those at which other Irons can be laid down. From the South come reports of increasing demoralization. It looks as though the Southern Iron which is being driven back out of Western territory by local Irons will exert increased pressure upon the sea-

board markets. During the past week a sale has been made of 5000 tons of warrants to English parties, thus following up sales of 3000 and 3600 tons recently made. It is estimated that from 40,000 to 45,000 tons of warrants have been taken thus far for English account. Quite a number of small Cast Iron Pipe contracts have been placed lately, among them being Tonawanda, 1400 tons for New York at \$19; Yonkers, at \$21.85; Pittsfield, at \$21.40, and Springfield, at \$22. A gas company in this city is in the market for 17,000 pieces. It is reported that this company will in all require over 70 miles of Pipe. We quote standard brands \$13 @ \$13.50 for No. 1; \$12 @ \$12.50 for No. 2; \$11.25 @ \$12 for Gray Forge, at tide-water. Southern Iron, same delivery, \$12.75 @ \$13.50 for No. 1; \$11.25 @ \$11.75 for No. 2; \$11 @ \$11.50 for No. 3; \$11.25 @ \$11.75 for No. 2 Soft, and \$11.75 @ \$12 for No. 1 Soft. Foundry No. 4 (Foundry Forge) is \$10.50 @ \$11.

### Ferromanganese and Spiegeleisen.

—Even in New England foreign Ferromanganese is now driven out by domestic, a small order having been placed last week. We quote domestic Ferromanganese \$51 @ \$51.50, tidewater, and foreign Spiegeleisen nominally \$21 @ \$22 for 10%, and \$24.50 @ \$25 for 20%.

**Billets and Rods.**—In Billets the market is dull. Reports from the West concerning Wire Rods are somewhat conflicting. The majority of makers are full of work and ask \$25 at mill, and yet the report is current that one large concern is willing to book at very much less than that figure. We quote \$18.25 @ \$18.75, tidewater, for domestic, and \$27 @ \$27.50 for foreign Billets. Domestic Wire Rods quoted at \$27.25 @ \$27.50, tidewater, while foreign are nominally \$39 @ \$40.

**Steel Rails.**—Rumors are persistently circulated that lower prices are being made on standard Steel Rails. One of the largest firms of Iron merchants in the country tried during the past week to place a good order at a concession, but did not succeed. It is possible that the reports originate through the fact that the market in light sections is in a demoralized condition. Twenty-five dollars is openly quoted, and no distinction is made whether the Rails be 25 lb, 30 lb or 40 lb per yard. As a matter of fact lower prices have been accepted. In one case, when in competition with foreign makers on a small export order, a Pittsburgh mill accepted \$24, delivered to ship. The official price remains \$24 at mill, or \$24.20 at tide-water, for standard sections. Inquiry made in Germany show that under the Wilson duty foreign Girder Rails can be laid down in New York at a shade over \$28, which is the present price, delivered, for American Girder Rails.

**Track Material.**—We quote as follows for small lots: Spikes, 1.70¢ @ 1.80¢; Fish Plates, 1.30¢ @ 1.40¢; Track Bolts, Square Nuts, 2.10¢ @ 2.40¢, and Hexagon Nuts, 2.30¢ @ 2.50¢, delivered.

**Manufactured Iron and Steel.**—Competition for all orders coming up is fiercer than ever, and extraordinary prices crop up almost daily. Still there is a good deal more business than there has been, and there is a large amount of figuring going on. A rolling mill in this district has taken about 1000 tons of Bridge work in Pennsylvania. On Architectural work the large extension

of the New York Life Insurance Company is awarded, as is also a ten-story office building on upper Broadway. Nothing definite is yet known in regard to the rumors that the American Surety Company's building had been taken on commission. In Plates an order for 600 tons of No. 11 Light Plates was placed here at private terms. Pittsburgh has offered Steel Bars in this market at 1.15¢, equal to 1¢ at mill. We quote nominally: Beams up to 15-inch, 1.40¢ @ 1.50¢, for round lots; Angles, 1.35¢ @ 1.50¢; Universal Mill Plates, 1.35¢ @ 1.50¢; Tees, 1.60¢ @ 1.70¢; Channels, 1.45¢ @ 1.60¢, on dock. Steel Plates are 1.30¢ @ 1.40¢ for Tank; 1.40¢ @ 1.65¢ for Shell; 1.70¢ @ 2¢ for Flange, and 2¢ @ 2.50¢ for Fire Box, on dock; Refined Bars are 1.40¢ @ 1.9¢, on dock, and Common 1.25¢ @ 1.30¢; Soft Steel Bars are 1.20¢ @ 1.50¢; Scrap Axles are quotable at 1.35¢ @ 1.50¢, delivered; Steel Axles, 1.35¢ @ 1.50¢, and Links and Pins, 1.40¢ @ 1.60¢; Steel Hoops, 1.50¢ @ 1.70¢, delivered; Cotton Ties, 70¢ @ 72½¢ @ 45-lb bundle, at mill; Machinery Steel, 1.35¢ @ 1.50¢; Toe Calk, 1.90¢ @ 2¢, and Sleigh Shoe, 1.65¢ @ 1.75¢, delivered.

Lester E. Wood has established himself as a broker in Pig Iron warrants, Pig Iron and Cast Iron Pipe, with an office at room 71, 115 Broadway. He has issued a circular referring to the advantages of warrants for investment.

## British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, February 28, 1894.

Pig Tin prices have further receded, the figures for prompt delivery going slightly below £66 under the influence of the depression in silver and uncertain Eastern exchange. From the lowest point there was 5/ @ 7/6 improvement, under the influence of reaction in silver and covering of "short" accounts, but the market flattened when this demand was satisfied. At the close the prices were £65. 15/ for prompts and £66. 15/ for three months' futures.

Copper has averaged somewhat lower and sold down below £41 for Merchant Bar prompts, owing to lack of support from leading operators and unfavorable effect of the depression in silver. A few trades were made at £40. 18/9. The low rates attracted buyers to some extent, but the support from this was short lived and prices receded. Last prices were £40. 17/6 for Merchant Bar prompts, £41. 7/6 for three months' futures and £44 for Best Selected English.

Business in Tin Plate has been moderate. Buyers seem still to limit orders to immediate wants, although making more inquiries. The impression is that business is likely to continue until buyers offer better prices, since makers are more disinclined to do business at a loss. Several makers have refused to enter orders at prices that were accepted a week ago. Black Plates are held at somewhat higher prices. The Pontymister workmen have given notice of termination of their contracts, owing to a dispute on Saturday with the owners. Liverpool prices are quoted as follows:

IC Charcoal, Alloway grade.....12/3 @ 12/9  
IC Bessemer Steel, Coke finish.....10/6 @ 11/1  
IC Siemens.....11/ @ 11/3  
IC Coke, B. V. grade, 14 x 20.....Nominal.  
Charcoal Terne, Dean grade.....10/3 @ 10/9

Pig Lead has been quiet and the market is barely steady at £9. 5/ @ £9 7/6 for Soft Spanish.

Spelter prices have ruled considerably lower and the market closes flat, with sellers at £15. 10/ for ordinary Silesian.

No change of importance has taken place in the Iron and Steel trades, business being slow. Warrants have ruled somewhat lower in price, with late sales at 43/ for Scotch, 36/ for Cleveland and 45/ for Hematite.

### The Tariff in the Finance Committee.

The majority of the Senate Committee on Finance held a protracted meeting to-day, which was more devoted to an effort to reach an understanding with the minority on the subject of consideration of the bill in general committee than upon the provisions of the measure itself. The minority are opposed to the entire measure and wish to make an effort at least to change its provisions before it reaches the Senate. Senators Morrill, Sherman, Jones of Nevada, Allison and Aldrich of the minority insist upon such a course to the extent of a few days, and unless the committee is packed with two new members in the place of Harris and Vance the majority will be compelled to acquiesce.

The statement in *The Iron Age*, where the committee circulars of inquiry were printed in advance of all other papers, that the replies would receive no attention from the majority of the committee and would have no influence has been fully sustained in practice. A large number of manufacturers went to the trouble to send replies to the committee, the majority of which were not even opened, and not one of which was examined by a member with reference to any influence whatever upon the modification of the bill. The whole scheme, as anticipated, was to deceive the people by making them think that the committee were very solicitous of their interests.

The metal schedule as it now stands is: Iron ore, free in the House, 20 per cent. This, however, is subject to change and may be left open for the Senate to determine. Cotton ties, free; nickel and oxide, free; old copper, plates and bars, free; needles, free; pig iron, spiegeleisen and ferrosilicon, 20 per cent.; scrap iron and steel, wrought and cast, ferromanganese, 10 per cent.; iron slabs, &c., 22½ per cent.; bar and round iron, &c., 25 per cent.; structural iron, 30 per cent.; boiler iron, 25 per cent.; forgings of iron or steel, 25 per cent.; hoop, band or scroll, 25 per cent.; railway bars of iron or steel, 20 per cent.; sheets of iron and steel, not thinner than 25 wire gauge, 35 per cent.; sheets of iron and steel, thinner than 25 wire gauge, 30 per cent.; sheets or plates of iron or steel, galvanized, 35 per cent.; tin and terne plates, taggers' tin, 1½ cents per pound; steel ingots, castings, &c., 25 per cent.; wire rods, 25 per cent.; wire of all kinds, 30 per cent.; iron or steel wire rope and strand, 35 per cent.; the various manufactures of iron or steel range from 25 to 35 per cent., penknives and razors being 45 per cent. The not specially provided for provision is 55 instead of 45 per cent. Pig lead and bars remain at 1 cent per pound.

The Senate bill is practically the same as that of the House in all its details. There is no prospect whatever of any change in the Senate except on coal, which may be rated at 50 cents a ton, and iron ore at 20 per cent., and a duty on sugar.

Senator Morrill, who is one of the foremost champions of the interests of iron in the Senate, will, with the assistance of his colleagues, make an effort to increase the rates on the different grades of iron before the bill is finally adopted by the whole Finance Committee for report to the Senate. Then will come the determination of the minority policy in its consideration on the floor of the Senate.

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# HARDWARE.

## Condition of Trade.

**F**EBRUARY CLOSED with only a moderate volume of current business, the aggregate of the month's trade, however, having been fair. It is hoped that trade will assume a more normal activity during March. Prices are without important change, being somewhat better on such leading goods as Barb Wire and Wire Nails, owing in part to concerted action by the manufacturers, and also to a reaction from the extremely low prices which have been ruling for some time. In most lines, however, the market is not especially strong, and manufacturers are showing a disposition to shade prices to secure business. There is some complaint in regard to collections, but on the whole they are referred to as fair.

### Chicago.

(By Telegraph.)

The character of the Shelf Hardware trade is changing to some extent. The demand is running a little more to straight Hardware and less to staples than has been the case from the beginning of the year up to a very recent date. Merchants are more closely examining into the character of their stocks, and finding that they need Builders' Hardware and other shelf goods for spring business are ordering a little more freely in this line. The demand for staple goods and seasonable goods has perhaps fallen off in about the same proportion, so that the volume of business can hardly be said to have improved. The change toward straight Hardware nevertheless is appreciated by the jobbers, who are anxious to see considerably more movement in this branch of their trade, from which better remuneration is ordinarily obtained. The Heavy Hardware jobbers are feeling serious results from the recent heavy snowstorms and the cold weather which followed. Their trade has fallen off, and the shrinkage in the volume of business has at the same time been attended by efforts of sellers to increase business by offering concessions in prices. The only effect thus far has been to demoralize buyers and cause them to defer purchasing in the hope that they may be able to do still better. The low prices made are affecting such articles as Carriage Bolts, Machine Bolts and other staple goods of the same class. Prices on iron and steel are dropping, and it is

not yet apparent that bottom has been struck.

### St. Louis.

(By Telegraph.)

The local Hardware jobbers report a fair trade only. In making comparisons with last February they find a falling off with no immediate prospect of an early revival. In some lines a fair trade is reported, but the general market shows a lack of snap. Barb Wire continues to be in good demand, while Wire Nails fail to improve either as regards price or demand. Paints, Window Glass and builders' goods generally show signs of improvement, and unless the weather interferes the prospect for this class of goods is encouraging. Prices in many lines are being shaded, and advances are now few and far between. Collections are a trifle slow.

### Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—All the jobbers have their men in the field and the year's business may be considered as fairly begun. Trade is considerably below the amount for the corresponding months of 1893, but it is undoubtedly on a safer basis. The feeling is growing stronger that prices have touched bottom, but the extreme low figures do not seem to tempt large purchases.

In our territory, at least, the country dealers seem disposed to wait yet awhile before venturing further than to supply immediate wants. It will take something more than the slight advances reported in Nails and Wire to assure dealers that the turning point has been reached and to induce them to stock up.

While collections continue only moderate, yet the feeling prevails that the weak and insolvent concerns are pretty well weeded out, and the summons to a meeting of creditors is, we are happy to say, of less frequent occurrence than for a long time heretofore.

### Cleveland.

THE W. BINGHAM COMPANY.—Since our last, trade has been rather erratic. Some days business would assume its old time briskness, and the feeling that it had come to stay would almost seize us, when our hopes would receive a decided setback by a few days dullness. The aggregate for the past few weeks, however, is satisfactory, as compared with the closing months of last year. The advance on Wire and Wire Nails has put somewhat of a check upon orders for these commodities, but as the mills are full of orders there seems to be no prospect of settling back to old prices. These are the only lines which have shown a tendency to firmness. Season goods still constitute a large portion of the orders, Poultry Netting and Wire Cloth particularly being in large demand. We can detect a slightly better movement in mechanics' tools,

which is generally an indication of better business.

### New Orleans.

A. BALDWIN & CO.—Business has quieted down considerably here during the past two weeks. Much of the depression is, of course, owing to the tariff legislation pertaining to sugar, which interests our State to so great an extent. Continuous heavy and cold rains for the past week have about closed up all chances of travelers getting around to see customers or of customers getting to the city to make purchases. The waiting policy seems to have possessed everybody, not only in our own line of business, but in all lines. Prices, no matter how low, are no temptation whatever for merchants to buy anything except for immediate wants. There does not seem to be any activity in any line. As soon as the tariff legislation is over, and our people will adapt themselves to the new situation, we believe business will settle down on a more satisfactory basis. As it is, there is uncertainty in every line. Jobbers do not want to buy; country merchants do not want to buy; in fact, every one is at a complete standstill awaiting developments. We cannot see very bright prospects for any large volume of business in the next three or four months.

### Omaha.

LEE-CLARKE-ANDRESEN HARDWARE COMPANY.—Considering the commercial situation at other points, it is sufficiently encouraging to know that Omaha has not only held her own but has even experienced a slight improvement. Very few reports from other jobbing centers show an equally satisfactory state of affairs. While business is by no means rushing and can be taken care of without much special effort, still it must be remembered that the season, as the saying goes, is just now "between hay and grass."

Spring trade is somewhat late this year in manifesting itself, and it is very probable that the condition of real activity in business circles will be delayed perhaps a matter of 30 days yet. As a rule, the jobbing Hardware trade are satisfied with the volume of business presented. The presumption is generally conceded that the volume of trade for the first six months of this year will not be as phenomenal, by any means, as last year, and if it should compare favorably with the same period of 1892 expectations will be gratified and we think no complaints will be heard.

In all probability the heaviest portion of this year's business will be done in the fall months, but as this will entirely depend on the crop prospect, which is regulated by the prevailing atmospheric conditions, it is too early at this time to venture a prediction with any degree of certainty.

After a long period of drought the recent heavy snowfall and thaw has



produced most beneficial effects, soaking the ground thoroughly, and placing it in the most desirable condition for receiving seed, and in fact for all other purposes.

It may be asserted as a fact that buyers will not resume their old time liberality in the way of purchasing until the next crop is absolutely assured, and then it must be satisfactory as to quantity, quality and price.

### Philadelphia.

#### SUPPLER HARDWARE COMPANY.—

Trade conditions during the last two weeks show a fair distribution of Hardware, but not so great as the preceding two weeks. Trade has been interrupted owing to the quick return of cold weather, and the recent storms also interrupted during the last week, also the fact of February 22 being a legal holiday, and still further, our State trade was interfered with somewhat one day owing to the State election. The surprise of the election, we notice, has been heralded in the daily papers throughout the entire country, being, as one of the Administration organs puts it, "such a flop" as was never before known. The remark was made owing to the fact that our present Democratic State Governor — Governor Pattison — was three years ago elected by about 17,000 majority, the present showing being 183,000 majority on the opposite side for the Republican candidate, making the "flop" referred to one of about 200,000; but then the present Governor of Pennsylvania is a far more popular man in this State than President Cleveland is with his party, and it will be remembered at the time that it looked as though he might have been the Democratic Presidential candidate when Mr. Cleveland was nominated. Indeed, it is openly stated by many of his followers that had he been the successful candidate, the object lesson we have had during the last eight months would not have occurred.

This change in vote has naturally been traced to the unemployed voters of our State, the balance of the unemployed men being represented by those who are not eligible to vote together with those under 21 years of age, and the women and children.

There is still a disinclination to extend operations into the future, and a conservative policy is pursued by our local trade in buying, although depleted stocks of goods compel buying if one desires to retain and hold what trade there is on the surface. Unquestionably it is safe to state less curtailment is shown in Hardware than noted in every other branch of trade. The fact is, Hardware and its co-relatives are largely used in and for developments made indirectly to secure a livelihood, making improvements, and to secure a return for investment; therefore it is one of the last branches of trade to suffer and one of the first to show recuperation after the cause of the depression has been removed.

The delay in the action on the tariff bill has its depressing influence both upon trade and industrial resumption. This delay could not have been more scathingly denounced than it was in the rebuke of Mr. Bland in the House of Representatives one day during last week, and whether it be an advantage or a disadvantage with the manufacturer or wage earner, the sooner the

question of tariff is settled and business is adjusted to the conditions the better will it be for the country.

Collections continue without any material change, and the experience of our city trade coincides with the mercantile reports of the reduced numbers of failures, although far in excess of one year ago.

The great advance in Billets failed to show a decided firmness, consequently Barb Wire and Wire Nails are being quoted a trifle below the recent quick advance which was made. Manufacturers, however, feel confident this is but a question of a very short time. This, however, we feel is in the hands of Congress and not in the hands of the manufacturer.

There has been a large amount of sympathy expressed during the last few years for those who "till the soil." Secretary Morton recently stated that 30,000,000 of the people live on 6,000,000 of farms in this country. The fact is, during the last year the farmers and their families have suffered less than any other class of persons who have depended upon their labor for sustenance (if we except clerical force). When a wage earner is thrown out of employment his source of revenue ceases, while the farmer produces sufficient to live upon even if no sales of his product were made. Statistics will further show that the farmer, as a rule, has been more successful than the grocer from whom he buys his supply, or his dry goods house, or the Hardware merchant in his adjacent town from whom he makes his purchases.

While we admit a decline in the price of the farmer's product, yet it always has a cash value at some price, which brings him in a return. The wage earner, on the contrary, has no source of revenue. While the price of wheat has gradually receded during the last few years to one half its former value, so has all that the farmer buys receded to one-half its former value.

In 1879 wheat was quoted at \$1.07, and in 1884 it was quoted at \$1 per bushel; silver in 1879 was quoted at \$1.12, and in 1884 it was quoted at \$1, cotton being quoted at 10 cents in 1884. To-day wheat is quoted at about 60½ cents per bushel, silver at 60½ cents per ounce, cotton at about 20 per cent. less than in 1884. Hardwaremen will remember that in the first year named Barb Wire was sold at from 8 to 9 cents and Wire Nails at from \$4 to \$4.50 per keg. These now reach the farmer at about 2½ cents and \$1.50 per hundred weight respectively. His crops are far less expensive to harvest, his agricultural implements and tools and building material are less than one-half the former value. He provides clothing for himself and family, boots and shoes, furniture, carpets, table and kitchen requisites at from one-half to two-thirds less than at the dates named above.

He has the corresponding advantage of the reduced value on his own products, which are the essentials of life, and, as compared with the manufacturer, whose plant is constantly deteriorating, who must constantly renew his machinery, which not only deteriorates but needs replacing by new and improved styles, the farmer's plant (that is, his land) is constantly and yearly increasing and improving in value. Many of the Western farms have, during the receding values of merchandise during the last few years, constantly advanced in price, in many instances not only increased, but did so from two to three and even four fold. Indeed, the aver-

age advances in Western farm lands far exceed all the savings of a lifetime of a well paid wage earner; development of railroads adds to the farmer's wealth, as it also brings him nearer to the cities and towns, which naturally raises the price of the small product with local trade. So, take into consideration the smallness of the farmer's original investment and the dividends received from the sale of his yearly products upon the same, and you will admit a very fair showing.

Farmers who rely simply upon their wheat crop make a grave error. Present conditions necessitate a diversity of their products, and those who neglect corn, oats, hogs, cattle and sheep make a great mistake. Sheep have been allowed steadily to decline, and January 1 showed a decline of 10 per cent. during the last year; these can yet show some profit if raised for the mutton, with wool as a secondary consideration, even if the Wilson bill is adopted.

England, it is known, has sheep to the extent of one *per capita* upon their high valuation of land, while in the United States January 1, 1894, showed a little over one-half sheep *per capita*. The recent census shows that a trifle over 32 per cent. of the farmers in this country rent farms and a trifle over 67 per cent. own their own farms; 30 per cent. of those owning their farms have a mortgage of some indefinite amount upon them, but over 70 per cent. are free from incumbrances.

It is also a well-known fact that some of the investment companies have sent their solicitors out, almost in droves, soliciting borrowers of money on farm lands; the last few years past this has proven a great disadvantage to many of the honest farmers. They were frequently induced to take far more money than their actual wants required, and the ease of borrowing from these companies by the inexperienced led them to spend money thus easily obtained entirely too freely, and like some merchants borrow and give a chattel mortgage on their stock, forgetting for the time that pay day must surely come, and frequently like a thief in the night, when one was quite unprepared for him.

But notwithstanding all these unwise borrowers, they, as a rule, have been able to retain their farms, and it is stated that in the State of Iowa the horses held by the owners of farms, taken at \$77 per head, would bring a sufficient amount to clear all the farms in the State of mortgages.

As an illustration of how easy it has been for a person to secure money on lands from some of these investment companies, the writer would state that during a visit in a large city west of St. Louis a few years ago, circumstances brought him in contact with a man who was in the city to secure a mortgage on a piece of land that he owned. He had secured a loan in excess of the value of the farm and had abandoned it and bought another farm at about the price the former cost him. Upon this he had no difficulty in securing a mortgage for more than its real value; this he also abandoned, and the writer found him trying to secure a mortgage on a third piece of land that he might unload on this investment company. We only state this to show how largely farmers were induced to take money and give a mortgage on their land.

The fact is the American farmer must now prepare himself for the inevitable. Wheat is likely to continue at a low price for some time to come unless ex-



ceedingly prosperous times should appear at a time when there was a shortage of wheat throughout the world, but having large crops the farmer must depend upon the price of wheat in the future at the price named in London. The wheat area has been gradually increasing both in this and other countries, so that the American farmers must adapt themselves to the present condition and circumstances. Russia, India, Australia, and especially the Argentine Republic have become aggressive competitors, and the vast expanse of this territory, especially the Argentine Republic, has scarcely yet (comparatively speaking) shown the results of the plow; it will naturally be known, therefore, that prices will be controlled by European buyers, as the wheat producing capacity of the nations mentioned above is simply enormous.

The Pennsylvania farmer has one advantage in his wheat required for shipment to Brazil. It is a peculiar fact that wheat sections in the State of Pennsylvania and a portion of Maryland are far better adapted for flour shipments to South American ports than any other wheat section in this country. In fact, this is the only wheat that can with positive safety be sent to that country, the atmospheric changes from night to day having a damaging effect upon the flour sent from Western sections; this naturally gives additional value to the Pennsylvania product, which could be increased had we constant and direct communication, but European subsidized steamers to foreign countries gives them an advantage; this advantage is looked upon in our country as paternalism, and the jealousy shown by politicians in this country against success naturally will have its effect, until we have a far greater object lesson than we have recently gone through. But if we expect an increase of export trade to be on an equal footing with foreign competitors, this is inevitable.

Pennsylvania farmers complain that tobacco raising deteriorates the land; true, but the raising of tobacco can be rotated with other crops and the profit on the product of an acre on tobacco in one year has been known to be sufficient to pay the price of that particular acre.

#### Baltimore.

CARLIN & FULTON.—It was the experience of many that the month of January opened the present year rather encouragingly after the depression with which December ended, and it was hoped that this month would continue in the same line of improvement, but we cannot learn that these expectations are being fully realized. To be sure, there has been from some sections a fair demand for such goods as are needed in agricultural pursuits, but the trade in Building Hardware and in mechanics' tools is far from being satisfactory.

After the bitter experiences of last year it was to be supposed that our national representatives would hardly dare to take any steps which would endanger our currency and that out of the ignorance (to call it nothing worse) of finance would be evolved at least a respect for the opinions of the business interests of the country; and yet the silver specter has appeared again and the scenes of the last few days in Congress are a shame to the nation.

If business is anything to-day, or if it revives, it will be in spite of and not

through what Congress has done for it. As to the tariff, with the Wilson bill undergoing probable dissection in the committee rooms of the Senate, and the possibility of a greatly modified or changed bill being offered for another lengthy discussion, and the uncertainty as to when it will terminate, trade languishes and is confined almost to the absolute necessities for the day's consumption.

The question, however, arises in our mind, What will cause a revival in trade even after all doubt is ended as to the Wilson or any other tariff bill? Suppose the present duties continue and no new bill pass, will the manufacturer resume in advance of a demand and store his productions awaiting the turn of the tide, and will the consumer, with cotton in one section at 6 cents per pound and wheat in another section at, say, 60 cents per bushel, be able to buy what he actually needs, but which he cannot pay for; or with the defeat of tariff reform will the value of our agricultural products advance so greatly as to gladden the hearts of the farmers and stimulate business to such an extent that the demand will equal the supply?

Of what avail are high wages unless there is employment for labor and how can there be employment without a demand for the articles produced? and though there is a need here can be no demand until what grows upon the earth or is dug out of it brings in the market of the world a recompense for the labor and the cost involved in the production.

#### St. Paul.

FARWELL, OZMUN, KIRK & Co.—During the last two weeks trade has somewhat improved. Jobbers would not complain of the number of orders received, but their size is smaller than in former seasons. Still it is evident that, taken altogether, trade will improve from now on quite perceptibly. Stocks in hands of retailers are low, and so are prices, and goods will move as the season advances, though not up to the volume, in dollars, of the trade in '92, or perhaps in '91.

Prices are generally satisfactory.

Price of Nails has advanced and promises to hold firm. The mills, as well as the jobbers, seem to have come to the sensible conclusion not to do business longer without profit and it is to be hoped they will stick to it.

Collections are light—have never been more so in February unless in a month of unusual storms, whereas the present month has been no exception to unusually fine weather of this entire winter in the Northwest. We escaped wholly the very severe storm which swept south of us from the Rockies to the Atlantic. We can hardly expect to keep up this record throughout the winter, but while it does last it has a very beneficial effect on trade as well as on many other phases of life.

### Notes on Prices.

Wire Nails.—The volume of business is fair and with the orders booked during the past month or two the manufacturers will be well occupied for some time to come. In the matter of price the market is in excellent condition and has a firm tone. Manufacturers are adhering to the quotation of \$1.10 for carload lots at factory, and in some cases are naming a somewhat

higher figure. The good understanding which exists between the manufacturers of Wire Nails and Barb Wire contributes not a little to the strength of the market, especially in view of the action which has been taken in regard to the raw material. At the present time it is thought by some well informed parties that existing quotations will be not only maintained but that slight advances in the near future are not unlikely.

Chicago, by Telegraph.—Low prices on Wire Nails now appear to be a matter of the past. Present indications favor an advance in the near future, depending on the disposition of the leading manufacturers. They have gained absolute control of the situation in some essential particulars. They have in connection with the Barb Wire manufacturers bought the surplus product of the active wire rod mills up to July 1 and have in addition succeeded in removing some competition in the Wire Nail trade, which might have proved annoying during the next month or two. It is likely that some large merchants who were resting in the belief that they had secured very low contracts on Wire Nails may suddenly find that these contracts are with parties who will not be able to fill them. The replacing of such contracts on the market under present conditions can hardly fail to have a decidedly stiffening effect on prices. The actual volume of business within the past week has not been large, but inquiries were good and considerable trade is in sight which must speedily be closed. Manufacturers' prices are continued at about \$1.20 to \$1.25 Chicago, while small lots from jobbers' stocks are selling at \$1.25.

Cut Nails.—There is little new to report in the Cut Nail market. The volume of business is fair, but not heavy. Prices are, however, quite well maintained on the basis in the East of \$1.05 for carload lots on dock, New York, the manufacturers adhering strictly to their policy recently adopted of quoting only prices for Nails delivered. The Western market continues steady at \$1 to \$1.05 at mill. The price from store in New York is firm at \$1.15.

Chicago, by Telegraph.—An excellent week is reported in Cut Steel Nails. Good orders have been received from the greater part of the Northwestern territory, as well as in other sections which are not usually regarded as tributary to this particular market. While the volume of business in Cut Nails cannot be said to show remarkable growth, at the same time it is of a character to give considerable encouragement to the local manufacturers. Outside factories are doing very little at present in this locality on account of the close prices made here. Quotations are continued at \$1.05 Chicago, on a 60-cent average for factory lots. Job-

bers are selling small lots from stock at \$1.15 to \$1.20.

**Barb Wire.**—The recent advance in the price of Barb Wire has had the effect of checking for the time being the demand, but a good many orders representing in the aggregate a considerable quantity of Wire have been placed at the new prices. The manufacturers are evidently working together in harmony and their agreement tends to give the market a steady, if not a strong tone. Quotations for carload lots of Four-Point Galvanized are as follows: Pittsburgh, \$2.15; Cleveland, \$2.20; Cincinnati or Allentown, \$2.25; Chicago or New York, \$2.35. An advance of 5 cents per 100 pounds is made on less than carload lots.

*Chicago, by Telegraph.*—The influences prevailing in the Wire Nail trade are operating in precisely the same way in Barb Wire. Manufacturers are well supplied with orders, and business is coming in quite freely, so that the outlook is good for a large spring trade. Stocks have been even lighter in manufacturers' and merchants' hands than those of Wire Nails, and there seems to be no reason why there should not at an early date be a heavier movement in Barb Wire than was seen last month in Wire Nails. If this is the case, prices will very probably advance materially. Manufacturers' quotations on Galvanized Barb Wire are now \$2.35, Chicago, while small lots from stock are selling at \$2.35 to \$2.40.

**Ideal Shot Shell Loading Machine.**—Ideal Mfg. Company, New Haven, who are manufacturing this machine, a description of which was given in our last issue, are selling it to the trade at \$7 list, subject to a discount of 25 per cent.

**Lape's Scissors Sharpener.**—This article was described in our last issue as put on the market by W. E. Lape, Syracuse, N. Y. The Sharpener is sold to the trade at \$1.50 per dozen net.

**The Havens Improved End Gate Lock.**—Fred. D. Glazier, Hartford, Conn., is putting this article on the market. A description of the Lock appeared in our issue 22d ult. The Lock is sold to the trade at \$5 per dozen pairs, subject to a discount of 30 per cent.

**Ball Bearing Well Wheel.**—A description of this Wheel was given in our last issue, as put on the market by the T. F. Cheriton Hardware Company, 62 Reade street, New York. The Wheel is sold to the trade from the following list, which is subject to a discount of 35 per cent.:

|                                      | Per dozen |
|--------------------------------------|-----------|
| No. 01, Japanned Well Wheel Pulleys  |           |
| 10 inch.....                         | \$8.00    |
| No. 02, Japanned Well Wheel Pulleys, |           |
| 12 inch.....                         | 12.00     |

**Glass.**—The situation in the Glass market remains practically the same as last week, as far as demand and quotations are concerned. There is a

desire on the part of manufacturers whose factories are in operation to secure orders even at a concession from regular quotations. It is reported that factories having a capacity equal to 262 pots have closed down within the past ten days, and that the number of pots, or their equivalent, now making Glass is 878 out of the 1800 pots in the country. During the month of March large orders for Glass are generally placed with manufacturers and jobbers, so that developments in this direction for the next 30 days will be watched with much interest. Pittsburgh quotations are reported as 85 and 10 and 5 per cent. discount for single strength, and 85 and 20 and 5 per cent. discount for double strength Glass. It is understood that more favorable prices are obtainable from both Eastern and Western factories.

### Architects' Extras.

**MUCH DIFFICULTY** has been experienced by the Hardware trade of San Francisco, as well as many other cities, in figuring on architects' specifications, because, after signing contracts, calls would be made for extras. This created dissatisfaction among the persons building, as an owner never knew the exact cost of a house until it was finished in every detail. This always necessitated an adjustment of extras furnished, often resulting in difficulties and misunderstandings. To obviate these troubles, the Hardware dealers of San Francisco and vicinity have signed the following agreement, which binds them not to furnish estimates unless they receive from architects or bidders an itemized list:

We, the undersigned, wholesale and retail Hardware dealers, located in and doing business in the city and county of San Francisco, Cal., believing it to be the best interests of dealers, architects, contractors and owners, do hereby agree and bind ourselves thereto.

That on and after this date we will not give or make an estimate on either the rough or finishing Hardware from any plan or specification for any building or buildings, or allow the same to be done through us, or give or make an estimate on any bill or quantity of Hardware, unless we are first furnished with an itemized list or schedule of said Hardware to be estimated upon.

The following are the firms which signed the agreement: Dunham, Carrigan & Hayden Company, Huntington-Hopkins Company, Miller, Sloss & Scott, Hawley Bros. Hardware Company, Baker & Hamilton, Bennett Bros., Palace Hardware Company, Joost Bros., Charles L. Ackerman, R. F. Osborn & Co., F. W. Wright, G. W. Alexander, Charles Brown & Son, John F. Myer & Co., J. H. Kruse, Adolph Meyer, F. G. Norman & Sons, Lunt Bros., H. Gracey.

THE I X L Wire Fence Ratchet or Tightener and the I X L Wire Fence Roller Staple, manufactured by O. P. Schriver & Co., Cincinnati, Ohio, are

illustrated in their page advertisement in this issue. An illustration is also given showing the manner in which these goods are used and the advantages secured by the employment of this Ratchet where Fencing is erected upon irregular surfaces.

### New England Iron and Hardware Association.

**ARRANGEMENTS** are being made to make the annual dinner of the New England Iron and Hardware Association, on Tuesday, March 13, an especially successful and enjoyable occasion. As relating to it the following official announcement will be of interest:

The annual dinner of the New England Iron and Hardware Association will be held at the Parker House, on Tuesday, March 13, 1894, at 6 o'clock p.m. Reception from 5 to 6 p.m.

The following gentlemen have accepted invitations to be present and are expected to address the association:

- HON. FRED. T. GREENHALGE,  
Governor of Massachusetts.
- E. BENJAMIN ANDREWS,  
President of Brown University.
- HON. JOHN A. LANE,  
President of Boston Merchants' Association.
- HON. J. B. SARGENT,  
Mayor of New Haven, Conn.
- WM. H. WILLIAMS,  
President of New York Hardware Club.
- R. R. WILLIAMS,  
Hardware Editor of *The Iron Age*.
- GEN. CHARLES H. TAYLOR,  
*Boston Daily Globe*.
- CURTIS GUILD, JR.,  
*Commercial Bulletin*.
- REV. WM. H. BOLSTER,  
Harvard Congregational Church,  
Dorchester.
- HENRY A. THOMAS,  
Private Secretary to the Governor.

Tickets will be limited to 100. The price is fixed at \$6. It is earnestly hoped that each member of every firm belonging to the association will be present, and assist in making this one of the social events of the season.

There will be excellent music provided, and the dinner will be well deserving the reputation of the Parker House. The committee confidently ask the earnest and hearty indorsement of the members. Our trade has not been heard from in the business life of New England for a long time, and it is hoped that this occasion will place the club upon its proper level.

Tickets will be reserved for members first, and those desiring to invite guests will notify the secretary at the time they signify the number of tickets they wish for themselves, and those left over will be distributed in the order of the application. Please notify the secretary by March 1 how many members' tickets and how many guest tickets you desire, also names of those who will be present.

Address

FRED. H. BUTTS, Secretary,  
500 Atlantic avenue.

C. C. ADAMS, } Entertainment  
E. L. RICHARDS, } Committee.  
C. H. BOLLES, }

PITKIN & BROTHER, Fair Haven, Vt., who have been in the Hardware business for the past 30 years, have sold their store to the Norton Hardware Company of Richmond, Vt., who will continue the business.

## How Axes are Spoiled in Making.

THERE ARE very good Axes, very poor Axes and Axes that are neither good nor bad. A decidedly bad Axe is easily detected and wisely avoided by both dealer and user; but not so with the one which is too good to be readily condemned, yet not wholly bad. Like a lie that has enough truth in its physiology to hold it together, it is the more harmful because of its apparent reliability.

The Axe under discussion may lack finish, form or quality; and by quality we mean quality of material and such treatment of it as to render the tool serviceable; for poor steel, good steel improperly worked, or improper tempering of steel otherwise sufficient, is enough to thoroughly condemn any Axe, though faultless in shape and finish.

There are at least 25 styles or patterns of Axes. Long bits and short bits, square heads and round heads, square bits and rounded bits, Axes with ears and Axes without ears, broad bitted Axes and Axes as narrow in the blade as some people are in their ideas; then there is a varied combination of heads and bits sufficient to confuse any but an Axe critic.

Practically an Axe may be serviceable and yet be so shaped as not to be salable. It may even be of a correct pattern, yet not pass current except in certain sections of the country. A Yankee will do good work with the plain Axe, which is his favorite, while he would laugh at the patterns which would pass current as gold in California or cotton in the South. An Axe, then, must conform in shape to the demands of a particular trade; after which it must not be forged or ground too thin in the bit lest it break; neither must it be left too thick lest it be too clumsy and a "bad chopper." A woodsman will often clamor for a thin Axe and then grumble when it breaks from harsh usage. Give the same workman a thick Axe and he will grind it with a hollow in the center of the bit so the tool will stick fast when driven into the wood. The proper shape for the bit of an Axe is to have it slope gently from a point in the center of the bit, and about an inch from the cutting edge, to either corner of the blade. This insures free access of the Axe into the timber and prevents wedging. Some workmen prefer an Axe to be ground with a ridge in the center, but a rounded surface is generally preferred.

Axes are equally serviceable whether polished or bronzed, painted or unpainted; yet as long as men have a love for the beautiful, the more tasteful the Axe the more favorable the reception that will be accorded it. In addition to this, we may add that carelessness in finishing naturally indicates carelessness in manufacturing, so that where

any polish or finish is attempted, it should be of the best. A manufacturer is not likely to spend money on a tool which he knows cannot sell regularly in the market except as a second or third grade.

As before suggested, form and finish may be satisfactory and yet the Axe prove a failure. If poor iron or steel is used for the body of the Axe, it is liable to break across the eye when in use. If the bit steel is of a poor quality, or if it be overheated in working, the Axe will be next to worthless. If, whether through the fault of the workman who prepares the bit steel for the forger, or through the carelessness of the forger himself, the steel is not thoroughly welded to the body or poll of the Axe, use demonstrates the worthlessness of the tool.

Again, the steel composing the cutting portion of the Axe must be thoroughly worked under the hammer in order to refine it. Only by so working it can the steel be rendered even and capable of resisting a severe strain when put into use. Neither should the steel be heated after once refined, except sufficiently for tempering, without again being worked down. It may be said that in the selection and working of the steel there is the greatest chance for deception; and that a good judge of Axes can only become cognizant of such defect by subjecting the product to actual test. Economy may lead to the choice of cheap materials, or the employment of cheap labor, or the use of machines to do the work that hammers should perform; but if deception has been practiced a few blows from a small hammer will reveal the source of the evil.

If the temper is poor the Axe is of no great value, except as it may be sold to some individual or firm dealing in goods of that kind—those who want something very cheap and who will trust to luck to get their money out of the articles so purchased. Tempering steel is an art. Especially is this true in tempering an Axe, where portions of the blade are much thicker than others. There is danger that the corners will be too hard or the center too soft.

The exercise of much skill and great care is needed or failure is inevitable. Every piece should be tried with the hammer before the polisher is allowed to burnish the steel and careful inspection again made after polishing to determine possible miswelds and temper cracks.

## Hardware Examiners.

WE ARE ADVISED by the Board of Civil Service Examiners for the Customs District of New York that an examination for examiner of Hardware, Bronze Powder, Metal Laces, Needles, Pins, &c., will be held in this city, March 20, 1894. Applications to enter this examination must be made upon the prescribed form and must be filed in the office of the examiners be-

fore 4 o'clock p.m., March 12. Blank forms of application will be furnished upon written request by Theodore Babcock, Jr., secretary of the Board of Civil Service Examiners, Custom House, New York.

## Ice Cream Freezers.

THE ASSORTMENT of Ice Cream Freezers offered to the trade by the different manufacturers for the present season is substantially the same as last year, with the addition of one or two new Freezers and improvements in others. The manufacturers are giving their attention to improving the goods wherever there is an opportunity, especially in the way of more durable tubs, simpler and better protected gearing, easier methods of fastening and removing the gear covers and more thorough agitation of the cream. The following review of the market represents the Freezers offered by the leading manufacturers:

THE WHITE MOUNTAIN FREEZER CO., Nashua, N. H., are not introducing any feature especially novel this year in their Triple Motion White Mountain Freezers. The tubs are described as made of close grained, Northern grown, seasoned pine, bound with galvanized iron hoops, and after the tub is complete a chemical preparation is applied to make it absolutely water proof. The cans are made from a heavy grade of charcoal tin plate, all outside fittings are galvanized, and the gearing is completely covered. The dasher is of malleable iron, in two parts, which revolve independently of each other. The point is made that the cream is beaten all the time that the crank is turned, preventing the frozen cream moving around in the can and in the same direction. All inside parts are tinned. The company also make the Arctic Freezer, in the construction of which, it is stated, the same care is exercised in the selection of all raw material as for the White Mountain, and that no seconds are utilized in any way in the construction of the Arctic Freezer. It is explained, however, that the gearing of the Arctic being simpler enables the manufacturers to sell it at a much lower price than the White Mountain is sold for.

PEERLESS FREEZER COMPANY, Cincinnati, Ohio, are manufacturing the Peerless, Giant and Zero Freezers for the coming season. The improvements in the line of Peerless Freezers make them, it is remarked, easier to run and absolutely salt water and oil proof. It is stated that the automatic vacuum dasher is so constructed that the cream is aerated, lightened and rendered free from granulation. The crank can be used on the top or side of the Freezer, and all parts are made to be interchangeable. The Giant Freezer is constructed on the same principle as the Peerless, only much heavier, and is designed for hotels, confectioners, boarding houses, &c. The Zero Freezer is referred to as full size and well made, having the gearing completely covered. The company's Freezers are made in sizes from 3 quart to 10 gallon.

THE SAMUEL C. TATUM COMPANY, Cincinnati, Ohio, are offering the Ohio Freezer, Gooch's patent, in sizes from 2 to 25 quarts. The gearing is fully

housed and so arranged as to prevent dirt or oil getting into the can. The shank of the dasher comes up through the housing, so that the crank may be used on the top or at the side. The can has a cast iron top with gearing on it (concealed under the housing) giving one motion to the can, while the reverse motion is given to the dasher. The dasher on one side has spiral projections, to thoroughly stir up the cream from the bottom, while on the other is a wood strip, which, in the action of turning the dasher, presses closely against the outside of the can to allow the entire contents of the can to be thoroughly stirred. There is also provision for preventing the dasher being turned backward.

#### NORTH BROS. MFG. COMPANY

of Philadelphia are making Shepard's Lightning, Gem and Blizzard Freezers, in sizes from 1 to 14 quarts. This year they have adopted for their entire line the electric welded wire hoop pails, the hoops of which they claim are twice as strong as flat hoops, and are guaranteed by the company not to fall off. The cap covering the gearing on the Gem Freezer is now made separate and is bolted to the cross piece instead of being cast solid. The pails are made, it is stated, of the best Virginia white cedar. All inside parts of Freezers are thoroughly coated with pure block tin and outside parts galvanized. The point is made that materials and workmanship are of the very best, and all Freezers are completely wrapped in heavy paper to protect them from dirt and dust in transportation and while in stock.

#### CHARLES W. PACKER,

Philadelphia, is offering his Standard Freezers for families, confectioners, hotels, &c., in suitable sizes, the double action Freezers being made for hand or power. The automatic double acting vibrating scraper, which is used in all the machines, is described as adjusting itself closely to the inner surface of the can, removing the frozen cream as rapidly as formed, while the deflectors, lifters and cutters force the unfrozen portions to the sides of the can, causing continuous action upon the cream, by which the maximum amount of agitation is secured and the cream is thoroughly beaten. It is stated that the cans are made of the best quality, extra weight and heavily coated tin plate, the tubs of selected seasoned white cedar, the inside castings tinned, the outside castings galvanized, and that malleable iron fittings are used on the tubs.

#### V. CLAD & SONS,

Philadelphia, manufacture the Seamen Ice Cream Machine for hand and for power, with extra tub, can, beater and cover; also an extensive line of Philadelphia Ice Cream Machines for hand and for power, with and without engines, including 30 and 40 quart sizes. The cans for these Freezers are made of copper or tin. Freezers without beaters are made with wooden handle, malleable iron rims on body and cover and malleable iron bottom. The body is of DXXXX charcoal tin plate, with the rim around the top tinned. The concern also make Packing Cans, Carry Out Cans, porcelain lined Iron Cans, Cedar Tubs, extra heavy Shipping Tubs and a general line of Ice Cream Tools.

THE FIRM of Cranston & Jennings, manufacturers' agents, 60 Wabash avenue, Chicago, have been dissolved by

mutual consent. The business will be continued by T. H. Cranston at the same address.

## The Wellington Bicycles.

### THE STOKES MFG COMPANY, 293

Wabash avenue, Chicago, claim many special points in their Wellington No. 1 Bicycle, which occupies the leading position in their catalogue for 1894. It has a perfectly horizontal high frame of the diamond pattern; the tubing is of the Mannesmann special fiber, 1 inch in diameter, reinforced at joints; the connections are lap joint, all made from tubing; the head is 9 inches and the wheel base 43½ inches; the wheel is 28 inches in diameter, with rims of high grade cold rolled steel, crescent style; the spokes are No. 13 wire, 28 in front and 32 in the rear, nickel plated; the axles are of special quality steel; the tires are of the finest quality rubber, the inner tube being pneumatic, cemented to the rim, and 1½ inches in diameter; the cones and cups of the bearings are of the finest steel, Simond's balls being used, guaranteed to the thousandth of an inch; the handle bar is of the drop pattern, ½ inch tubing, handsomely nicked on copper, with composition grips; the brake is a drop forged, wide spoon with special outer curves, plunger style on front wheel, with a new and effective spring; the crank hanger is of special design, made entirely of Mannesmann spiral fiber tubing and drop forgings, the crank axle being made of special steel, hardened and polished; cranks are round, of special high grade steel, 6½-inch throw and nicked; the chain is Huber style, ⅝ inch wide, hardened link; pedals are dust proof, handsomely nicked, ball bearing, either rat trap or rubber; the saddle is very handsome, black with nickel spring, of new pattern; the finish is in heavy carriage lake enamel, carefully baked at even heat, with maroon rims, the frame having a fine line gold stripe; stripped light, it weighs 28 pounds; or, with wood rims, 26 pounds; the gear is 63 inches. It will be seen from this description that special pains have been taken in every detail. An advertisement of the Wellington machines will be found on another page of this issue.

## W. & J. Tiebout's Catalogue.

W. & J. TIEBOUT, 16-18 Chambers street, New York, issue a comprehensive catalogue containing 210 pages, devoted to Brass, Galvanized and Marine Hardware. The business was established in 1853 and incorporated in 1892. The book contains illustrations and list prices of Brass Butts in large variety, Brass Strap Hinges, Bagatelle Hinges, Hook Hinges, fancy ice house Hinges, Wash Tray Hinges, Brass and Galvanized; Galvanized Malleable Iron Hinges with Brass Pins, Galvanized Strap and T Hinges; Galvanized Hook, Hasp and Staples; Galvanized Hinge Hasps; Barrel, Square and Cupboard Brass Bolts; Flush Brass Bolts, Brass Paper File and Shutter Screws, Brass Sash Pulleys, Brass Sash Rollers, Brass Catches, Brass Hooks and Staples, Galvanized Hooks and Staples, Brass Rings on Plates, Brass Flush Rings, Chest and Skylight Handles, Brass Door Handles, Brass Buttons and Plates, Brass Ship

Locks, Brass ice house Lever Bolts, Brass Padlocks, Brass Bolts and Nuts, Brass and Galvanized Pulleys, Galvanized Malleable Iron Tackle Blocks, Galvanized and Brass Sheaves, Brass and Galvanized Boat Cleats, Rowlocks, Screw, D and Anchor Shackles, Galvanized Chain, Grapnels, Anchors, Ash Sculls and Oars, Steering Attachments, &c. The book is well bound in stiff covers, printed in large type and has an alphabetically arranged index near the front.

## Postal Telegraph Building.

THE AMERICAN AXE & TOOL COMPANY, now located in the Stewart Building, Broadway and Chambers street, have leased a suite of seven rooms on the fifth floor of the Postal Telegraph Company's Building, Broadway and Murray street. They hoped to get higher up, on the sixth floor, but were too late in deciding definitely. They will occupy their new quarters April 1. It will be remembered this is the building in which the Hardware Club will have its home. Mr. Mackey, the president of the American Axe & Tool Company, will also have a separate private office in this building. We understand several Hardware concerns are thinking of taking premises in this building, but from the number of leases already consummated it would seem that the desirable locations are fast being taken.

## Bicycle Notes.

THE MCINTOSH-HUNTINGTON COMPANY, Cleveland, Ohio, will this season market a line of Sunol Bicycles, including No. 6 roadster, N. Y. L. detachable tires, weighing 31 to 32 pounds, listing \$125; No. 06 light roadster, weighing 26 to 27 pounds, listing \$125; No. 4 light roadster, weighing 30 to 31 pounds, listing, with M. & W. tires, \$110, with Palmer tires, \$120, and with Dunlop tires \$120; No. 5 full roadster, weighing 36 pounds, listing, with M. & W. tires, \$110, with Palmer tires, \$120, and with Dunlop tires, \$120; ladies' Sunol, weighing 35 pounds, listing, with M. & W. tires, \$110, and with Palmer tires, \$120. Among the prominent features of these machines is the method of attaching the sprocket wheel, the chain adjustment, finish, and the general construction of the Bicycles. For medium grade machines the Hercules is offered in 28, 26 and 24 inch, the 28-inch listing, with 1½ inch Terrier pneumatic tires, \$85; the 26-inch, with 1½-inch pneumatic tires, \$65, and the 24-inch, with tangent spokes and 1½-inch pneumatic tires, \$55. The Stella is their medium grade ladies' wheel, the 28-inch, with 1½-inch Terrier pneumatic tires, listing \$85; the 26-inch, with 1½ inch pneumatic tires, listing \$65; the 24-inch, with tangent spokes and 1½ inch pneumatic tires, listing \$55, and the 22-inch, with ¾ inch cushion tires, listing \$25. Fairy Tricycles are also shown, with Steel and rubber tires, in sizes from 10 to 16 inches.

KNAPP & SPAULDING COMPANY, Sioux City, Iowa, issue a catalogue of Bicycles and Bicycle Sundries which they will handle during the coming season. The machines illustrated include the Imperial, Models J, K and N; also Model L,

for ladies; Syracuse Empire, Syracuse Model C; Matchless, in gents' and ladies'; Mascot, in gents' and ladies'; Harvard, Nos. 1, 3 and 8, for men and boys, and the Harvard, Nos. 4, 5, 6 and 9, for ladies. Illustrations are also given of Bells, Lamps, Saddles, Parcel Carriers, Locks, Repair Outfits, Clothing, &c.

### An Impostor.

A PERSON representing himself as connected with the Hardware store of Henry W. Merrill, 556 Grand street, New York, has been victimizing parties in this city during the past two or three weeks. The plan of the miscreant has been to present orders signed Henry W. Merrill *per* "Bowen," "Barrett," "Martin," or some other name, and requesting the goods to be delivered to him, which in most cases has been done. In signing receipts for the goods the impostor has invariably done so in a back handed style, so as to avoid similarity of penmanship. In this way he has succeeded in obtaining several bills of goods. Mr. Merrill has not seen the man, but from the meager descriptions of him given by some of the parties fleeced he appears to be an individual about 50 years of age, of very fair address. He is described as clean shaven, barring a mustache, somewhat above the medium height and rather stout.

### An Old Hardware House.

FOR OVER 110 years there has been a Hardware shop at 754 Chapel street, New Haven, Conn. This store is now occupied by the John E. Bassett Company, successors to John E. Bassett. Mr. Bassett, who is the head of the concern, began the forty-ninth year of his continuous connection with the establishment on the 9th ult. In 1846 Mr. Bassett entered the store as a clerk. It was then owned by E. B. M. Hughes, who had inherited the business from his father, Samuel Hughes. Some nine years later Mr. Bassett purchased a half interest in the concern and assumed the entire management of the business, the style of the firm becoming John E. Bassett & Co. In 1864 Mr. Hughes died and his interest was purchased by Mr. Bassett, but the name of the concern was not changed until 1887, when a joint stock company was formed to conduct the business. This company was styled the John E. Bassett Company, as above. The store is the oldest Hardware house in Connecticut and it is also believed to be the oldest business house in the State. The business was established in 1784 by Titus Street and was what would now be called a country store. In 1792 Samuel Hughes was taken in as a partner. The firm of Street & Hughes continued the business until 1802, from which time until 1821, a period of 19 years, owing to the unsettled condition of mercantile affairs because of the war of 1812, the firm dissolved and reformed several times as Street, Hughes & Co., Street, Sherman & Co., Hughes, Sherman & Co. and Hughes & Sherman. In 1821 Mr. Street retired from the firm. From 1821 until 1838 the business was conducted by Samuel Hughes. In the latter year it passed into the hands of his son, E. B. M. Hughes, Mr. Bassett's late partner.

IN HIS ADVERTISEMENT is this issue it will be observed that B. D. Washburn, 149 Congress street, Boston, Mass., offers at special prices a line of Harness and Wardrobe Hooks, illustrations of which are given.

### The American Axe & Tool Company's Catalogue.

THE AMERICAN AXE & TOOL COMPANY, New York, are about distributing a new catalogue of their entire line. It is handsomely printed in a delicate tint of green ink, on fine plate paper. The cuts are nearly all full size and engraved especially for this book. The book is bound in dark green cloth, stiff beveled board covers. On the back is the figure of an Axe in gold, with the name of the company in raised letters. Users of catalogues will appreciate this, as it enables one to quickly pick out the book from a large number of others without reading the title. There are 272 pages in all, 11 x 8 inches. The company refer to this work as containing almost a complete representation of all the different patterns of Axes. At the beginning of the book a page is devoted to the names of all the brands of tools made by this company. This is followed by an index in detail. To page 141 inclusive is given the various kinds of Axes. The following 88 pages are devoted to Adzes, Mattocks, Picks, Grub Hoes and Hatchets. The balance of the book is taken up with various tools such as Brick Hammers, Cleavers, Turpentine Tools, Bush, Bill and Grass Hooks, Hay and Corn Knives, Scythes, Ice Chisels and Box Openers. The last two pages contain the telegraph code. The catalogue is an exceptionally handsome one, which will be appreciated by the trade.

### American Machinery and Tools in Great Britain.

WE ARE IN RECEIPT from Chas. Churchill & Co., 21 Cross street, Finsbury, London, who are widely known as large importers into Great Britain of American Machinery and Tools of high class, of the following advices in regard to business in this line during the year 1893:

The year began with a very good demand and steadily increased to the close, and although we feared the commercial crisis in the United States, combined with numerous strikes in the coal and iron trades here, would curtail trade, the result proved that the four closing months of the year were our best months, and the total showed an increase of nearly 20 per cent. over 1892, and we have good reason to anticipate still further increase in 1894.

Among our sales in 1893 we report 136 Lathes, 127 Drilling Machines, 24 Milling Machines, 12 Planers and Shapers. In small tools 1800 Chuck, 700 gross of Hack Saws, 1075 Breast and Hand Drills, 400 Micrometers and Verniers and a large number of Twist Drills and other tools too numerous to mention. We have also done a good trade in foot and hand power wood working machines—viz., Circular and Scroll Saws, &c., over 350; Disston's Hand Saws, 300 dozen; Stanley Planes, &c., 5000; Wood Pulleys, 1300; Leather Belting, 22,000 feet, &c.

This, in the face of general dull trade here, shows that American Machinery and Tools are appreciated, and that the manufacturers here are realizing the fact that the best are the cheapest.

### Eugene McCarthy, Manufacturers' Agent.

SINCE THE FIRE a few months ago by which the establishment of the old and well known jobbing house of Robert McCarthy & Son, Syracuse, N. Y., was burned out the firm have been dissolved, it having been decided to discontinue the jobbing of Hardware. Eugene McCarthy, succeeding the former firm, is making a new departure as manufacturers' agent and direct representative, his plan being to represent manufacturers to the larger retail trade. The list of agencies which he has secured includes the following among others: Union Steel Screw Company, H. P. Nail Company, Mt. Carmel Bolt Company, Niles Mfg. Company, Ten Eyck Edge Tool Company, American Tin & Terne Plate Company, Phoenix Horse Shoe Company, Central City Bolt Company, D. Wadsworth & Son, Brown & Wales and Geo. Griffiths Company. Referring to Mr. McCarthy's plans we have from him the following advices:

It is an entirely new departure outside of New York, I believe, and I feel confident will prove successful. Manufacturers, I find, recognize the fact that they cannot exist and confine their trade entirely to the jobbing trade at the small margins received from them. As a consequence they must seek the larger and better class of retail trade, who buy in sufficiently large quantities to ship direct. In so doing they secure the same advance prices as do the jobbers. If they can obtain this business through a commission man, who, through handling a number of lines, can afford to do it less than the manufacturers can obtain it direct, they are very ready to make such an arrangement.

In the past few years I have noticed, when we were jobbing wholesale, as Robt. McCarthy & Son, that the tendency of the large retail trade was to buy direct. So much so, in fact, that fully five eighths of our business for 1893 was direct.

### Scheeler & Sons.

SCHHEELER & SONS, proprietors of the Buffalo Wire Works, Buffalo, N. Y., who for many years have been located at 145 Main street, the facilities of which have been outgrown, have recently purchased and taken possession of what has been known as the Kellogg Iron Works Building, situated on the Terrace, between Genesee and Court streets, embracing 316, 318 and 320 on the Terrace, and extending through to Jackson street. Here they have considerably larger and more commodious quarters, which will enable them to satisfactorily take care of their increasing trade. A view of the new plant appears in their advertisement in this issue. The ground upon which the factory stands is 65 x 200 feet in dimensions. Fronting on the Terrace is a four story and basement brick and stone building 33 x 100 feet, with a new addition in the rear 40 x 100 feet, which has been fitted up for the manufacture of Brass and Iron Wire work in all its branches. On one side of the plant provision has been made for further enlargement of the works when



necessary. The first floor of the main building is occupied by offices, sample and ware rooms. The upper stories are devoted to Wire Cloth weaving rooms and the storage of stock. New machinery and fixtures have also been added to the works. The new quarters are so located that they are easily found, being within a few minutes' walk of the City Hall and principal streets of the city.

### The Vaughan & Bushnell Factory.

**A**S MAKERS of Hardware specialties, the Vaughan & Bushnell Mfg. Company of Chicago have earned an excellent reputation. This has been acquired through many years of assiduous attention to business and a very careful watch of the developments of trade and the needs of consumers. They now occupy their own factory building, at 877 to 887 Carroll avenue, which was erected to meet the special requirements of their own business. They manufacture wrought work exclusively, such as Blacksmiths' Tools, heavy Chisels, Hooks, Punches, Scrapers, &c., together with Post Hole Augers. Such work consisting mainly of forgings, a very large hammer shop was required.

The works occupy a site of 150 x 125 feet, which is covered by a very substantial brick building two stories high along the entire front and one story high in the rear. The forging shop occupies the rear portion. Here are eight hammers, one of which is a direct acting steam hammer and the others are helve and drop hammers. A great deal of drop forging is done. Formerly Blacksmiths' Tongs were made mainly of iron, steel jaws being welded to the handles. They are now forged in one piece of solid steel, which requires dies of rather intricate shape to be used. Under some hammers there are double dies and the forgings alternate between them, thus being gradually brought to the required shape. Tempering furnaces and emery wheels and grindstones for finishing are also located in this room, which is well lighted from the roof by two rows of deck lights. In one corner a room has been inclosed by a partition, in which a tinning pot has been placed for tinning Meat Hooks and other articles requiring a coating of such metal. Adjoining this department is the engine room, containing a 100 horse-power Reynolds-Corliss engine built by the E. P. Allis Company of Milwaukee. Iron and Steel are stored in racks on this floor. The lower front of the front part of the building is cut into two by a driveway which runs from the street in front through to the rear. On one side of the driveway is the machine shop and on the other side is the storeroom. The machine shop is well supplied with tools, which are used in making dies, repairing machinery and finishing some portions of the work done in the forging room. The storeroom is filled with racks on all sides, the upper tiers being used for paper covered packages, while goods in bulk are stored in bins beneath. A portion of the second story is set aside for the manufacture of Post Hole Augers, in which the company do a large trade. Portable forges are used for certain parts of the work. Surplus stock is also carried on this floor in appropriate racks. Here also are the company's offices, which are very commodious, well lighted, handsomely finished in hardwood and supplied with all conveniences, including a dumb

waiter for communicating with the storeroom below. The works are well located as to railroad facilities, the tracks of the Northwestern, St. Paul and Panhandle railroads running along the rear.

### Brooklyn Hardware & Sporting Goods Company.

**B**ROOKLYN HARDWARE & SPORTING GOODS COMPANY have recently commenced business at 601 Fulton street, Brooklyn, N. Y. This company are organized under the laws of the State with a capital of \$20,000. The officers are H. H. Woodrough, president; J. B. Roache, treasurer, and J. A. Bolestier, secretary. Mr. Woodrough is a member of the Hardware Club of New York and was formerly connected with the National Saw Company. The company have fitted up a roomy and commodious store at the junction of Flatbush and Fulton avenues. They occupy the street floor and basement, each 85 x 22 feet. The trimmings are in light wood, natural finish. The sample room is in the rear. There are two front show windows, one of which contains a well arranged sample case about 6 feet high and 2½ feet square, with four glass sides. In the case is a four-sided form resembling the Washington Monument. It is covered with electric blue silk plush, and the sides are covered with samples of Pocket Knives, Scissors, Shears, Razors, &c. The company will carry in stock Builders' Hardware, Mechanics' Tools, Manufacturers' Supplies, Lawn Mowers, Refrigerators, Cutlery, Bicycles, Fishing Tackle, Tennis and Baseball Goods, Gymnasium Supplies, Boats, &c. They have already supplied a gymnasium with a \$1000 outfit. In the basement are samples of Row Boats, Sail Boats and Fishing Boats. The line they will handle will be from 13 to 20 feet in length and ranging in price from \$35 to \$500. They also carry a line of Guns, Revolvers, Ammunition and other Sporting Goods. A cash railway communicates with the cashier's desk in the rear of the store. Running ladders are in operation on both sides of the store and the two floors are lighted by electricity. In Bicycles they will put prominently forward the New Mail and Monarch machines. The company's plan will be to carry in stock fine goods and to seek the best trade.

### Charging for Original Cases.

**F**ROM A HARDWARE HOUSE in South Dakota we are in receipt of the following communication:

We have been annoyed a good deal off and on by jobbers charging for boxes and packing where goods were sent in original packages. Have they any more right to charge for a box or an original package than they have to charge for the kegs in which nails come to them? When we pay for their boxing and packing are we not directly paying their expenses? We would like to hear from other dealers through *The Iron Age*.

We take pleasure in laying this inquiry before our readers and would be pleased to hear from them in regard to it.

Our correspondents have, however, apparently written under a misapprehension, assuming that manufacturers

from whom goods in original package are purchased are not accustomed to make charges for the cases. In this matter, however, there is no uniformity of practice among manufacturers, and many of them, including some of the largest, invariably charge for cases. On the other hand, some manufacturers are not in the habit of charging for the cases in which their goods are shipped. Our advices, however, would indicate that the majority of manufacturers are in the habit of making such charges, and in such cases it is obviously only fair that the jobber in turn should charge for them to his customers.

### Back Orders.

**R**EFERRING to the matter of tardy execution of orders, as discussed in a recent issue, we have the following communication from a Hardwareman of California, in which some points are made deserving of the attention of the trade:

Under the head of "Trade Topics" in a recent issue of your journal I notice some timely remarks on the above subject. Thinking, however, that some pertinent things were left unsaid has prompted me to the following:

Your correspondent who suffered from the annoyance of making up an order for the sake of one article and then receiving everything but that one article will have the sympathy of every Hardware dealer who reads it; the experience is one so common that few indeed must be those who are so fortunate as to escape it. But there is something comical about the half despairing way in which a plea for a remedy is made. There is no "patent process" by which such things can be obviated.

Articles likely to be short mostly be long to one of two classes: either they are seasonable, staple goods, which, owing to heavy demand, have become exhausted, or they are unusual, seldom required, odd sized, &c. Now to expect a remedy from the "other side" would require every jobber to be invariably supplied with every article, both staple and unusual—a thing in itself impossible. The common mistake made by those sending orders of this kind is that they neglect to notify the jobber that any one part of the order is more important than the other, and yet that is the essential requirement. The jobber will then "scour the city" to find that particular article. With my firm the practice prevails of indicating such articles with the word "special," when writing the order. That is understood to mean "get it if you can" and gives the jobber authority to "buy out" if necessary at a higher figure than the regular one. In all other cases it is understood that goods are not to be "bought out" unless at figures within the regular prices of the house.

In the case of goods ordered from the factory, and sometimes from jobbers, which are put on back order, there is undoubtedly some cause for complaint in the frequent lack or inadequate amount of information tendered as to probable time of shipment, &c. Frequently an order is given and one may hear nothing of it for weeks, actually mistrusting at times that it has miscarried; finally you receive invoice—nothing more—still unaware whether your order has been traveling half way 'round the globe, or your credit been questioned or whether it is merely the usual time required in all cases. Such information would at least be a guide for the future. It is well to be brief in business communications, but to dispense with them entirely in such cases will hardly recommend itself. Receipt of all orders not promptly filled should be promptly acknowledged, with such information as to time of delivery, prices or changes as may be deemed of any importance to the house ordering.

### Marketing Goods Without Travelers.

FROM A WELL-KNOWN Hardware house in the Southwest we have the following communication in which they refer to what they regard as one of the causes of irregularity in prices and other annoyances in connection with business:

We have always contended that there is an overproduction of goods and that the drumming business is overdone, and is, to a great extent, the cause of demoralization and corrupt methods of doing business as practiced at the present time. We received to-day from a large manufacturer a circular which reads as follows:

DEAR SIR: After carefully considering our mutual interests, we have decided to discontinue the expense of transacting our business through traveling solicitors, and give to our valued customers the advantage of the saving in expense by making a proportionate reduction in prices to our established trade.

We recognize that the time has arrived when the most economical methods for conducting business must be adopted in order to furnish goods to dealers and consumers at the lowest possible price that will afford any margin of profit, and we feel confident that the trade will fully appreciate the advantages we are able to extend by dealing with them direct.

Our correspondents add that they predict this announcement to be the forerunner of many more.

A LARGE SALE of Granite Iron Ware is announced among our Special Notices by E. Bissell, Son & Co., 12 Murray street and 15 Park place, New York. The sale is by order of the St. Louis Stamping Company, and will take place on Wednesday and Thursday, March 7 and 8. The sale is absolute, and the entire catalogue with all duplicates will be sold without reserve.

### Manufacturers' Club.

THE MANUFACTURERS of Kings and Queens counties are perfecting an organization, modeled somewhat after that of the Manufacturers' Club of Philadelphia. The first meeting was held for convenience at the Union League Club, Brooklyn, Tuesday evening, February 20. The movement was started by H. B. Haigh, vice-president of the Iron Clad Mfg. Company. The call for the meeting stated the fundamental objects of the association to be:

To promptly advise all members of the association of any proposed national, State, county or municipal legislation which in anywise affects the manufacturing interests. To aid the carrying out of legislation in the interest of the manufacturer and the working people employed by the manufacturer, and to prevent by all honorable means the passage of any act detrimental to such interests. To properly represent the various interests of the manufacturers of Kings and Queens counties before Congress, with special relation at the present time to the proposed tariff bill known as the Wilson bill, with a view of obtaining any adjustment of schedules which may be necessary to properly protect the manufacturers' interests, or any of them.

The following concerns were represented at the meeting, either personally or by letter:

Iron Clad Mfg. Company, the Brooklyn Cooperage Company, Howard & Morse, Union Porcelain Works, the Nichols Chemical Company, Abendroth & Root Mfg. Company, Mollenhauer Sugar Refining Company, Martin Kalbfleisch's Sons, National Rivet Company, the Friedman-Doscher Company, Edward C. Smith & Co., William Vogel & Brothers, Chrome Steel Works, Schaffer & Budenberg, the Simonds Mfg. Company, Jennings Lace Works, Hanan & Son, Murcott & Campbell, E. V. Crandall, A. B. See Mfg. Company, P. Barrett, Son & Co., R. Dunlap & Co., W. C. Vosburgh Mfg. Company, Limited, Lalance & Grosjean Mfg. Company, Moller & Schuman, Logan Iron Works, American Wrought Anvil Company, Meurer Brothers Company, the United States Printing Company, the Braid Manufacturers' Association of the United States, the National Starch Company, Lidgerwood Mfg. Company, F. W. Wurster & Co., Acme Fertilizer Company, E. G. Webster & Son, H. L. Judd & Co., A. R. Whitney & Co., Brown & Peterson, Richie, Brown & Donald, Howard & Fuller Brewing Company, H. B. Scharman & Sons, Church & Co., American Stamping Company, Sperry & Beale, Crooke Smelting & Refining Company, Valentine Linn, Samuel Metcalf, George M. Eddy & Co.

The meeting was called to order by Ernest C. Webb of the National Rivet Company, and Henry B. Haigh of the Iron Clad Mfg. Company was elected chairman and Mr. Webb secretary of the meeting. After a general discus-

sion of the purposes of the association, a Committee on Permanent Organization and Permanent Officers was appointed consisting of the following gentlemen: Henry B. Haigh, Lowell M. Palmer, Thomas C. Smith, D. R. Morse, W. H. Nichols, William H. Leitch, William E. Reed, J. Adolph Mollenhauer, John H. Hansn, R. Dunlap, H. C. Beck, J. C. Cochran, John H. Schuman, W. L. Pearce, E. Dwight Church, H. J. Vogel, August Latz, H. B. Scharman, William Howard, F. W. Wurster, A. G. Jennings, Cord Meyer, Jr., Fred. Webster, Joseph E. Hinds, H. L. Judd, A. R. Whitney, T. J. Logan, Walter Manderville and Jacob Meurer.

At a subsequent meeting held February 26 at the residence of Lowell M. Palmer the Committee on Organization agreed on a constitution and by-laws which will be acted on at a full meeting called for Tuesday evening, March 6, at the Union League Club, Brooklyn. The committee will hold another meeting Friday evening, March 2, for the purpose of nominating officers for the ensuing year, which report will likewise be acted on at the meeting March 6. All manufacturers of Kings and Queens counties are cordially invited to send a representative to this meeting.

### Bicycles for Traveling Men.

DURING the past season a gentleman selling groceries at wholesale in one of the New England States has made use of a Bicycle as a means of conveyance from one town to another. The salesman in question carried no samples, and states that during the season of 1893 he rode over 7000 miles on his wheel. He also refers to the fact that he saved twice the cost of the machine in horse hire and railroad fare, while the mode of traveling was very much enjoyed by him. Other commercial travelers who have used Bicycles for this purpose have found them profitable and enjoyable, and this fact suggests something of a new field for the trade in general and for retail Hardwaremen in particular, inasmuch as the latter have an opportunity of bringing to the notice of resident travelers the utility and adaptability of the Bicycle to their requirements. While there are probably a limited number of traveling men who carry no samples whatever, there are a large number whose samples are light and can easily be carried on a wheel. In many instances, also, samples are of such a heavy and cumbersome character that it is necessary to forward them by express or as freight, in which cases it would obviously be convenient and economical for the traveler on his wheel to meet them at their destination. The traveling man will be quick to appreciate the advantages of having a conveyance exclusively at his disposal. Using a wheel as a means of transportation, he need not be hasty in securing an order, as is often the case when it is necessary to catch a certain train in order to get out of a given town on the same day. The vexatious experience of missing a train and being

compelled to wait three or four hours for the next one would also be avoided. He would be able to leave a town just as soon as he desired, ignoring railroad time tables or schedules. It will thus be seen that there are many advantages connected with the use of Bicycles by traveling men whose field embraces towns and cities within easy reach of each other, and Hardwaremen would probably find it worth while to bring the matter to their attention.

## Cooking and Heating by Electricity.

**C**ENTRAL ELECTRIC HEATING COMPANY, Havemeyer Building, 26-28 Cortlandt street, New York, manufacturers among other things of a large number of articles for culinary, laundry and heating purposes by means of electricity, have fitted up a room adjoining their suite of offices as a kitchen and dining room. This is in charge of a competent cook, who prepares every day a meal for the office staff and such as are desirous of seeing a practical demonstration of this method of preparing food or heating rooms. The implements made by this company are so arranged that to operate them it is only necessary to connect with any electric light wires in any room in a house. There is no danger from shock, the current admitted to houses being insufficient to do harm. Among other things the company manufacture Ranges with one or more ovens, suitable for roasting, baking, &c., Broilers, Toasters, Coffee and Tea Pots, Stew and Frying Pans, Tea Kettles, Laundry, Hat and Curling Irons, Glue Pots, Chafing Dishes, &c. For ordinary purposes, aside from space heating, it is stated this method competes successfully with coal at \$6 per ton. Unless water power is available, the entire heating of buildings, &c., at the present rates for supplying electricity is still a luxury. There are, however, residences in this city and Brooklyn where no coal has been used for two years for cooking, heating, lighting and laundry purposes. One point emphasized is that there is no dirt from coal or ashes, the current can be turned on or off instantly and the intensity of heat graded by simply turning a switch. In warm weather the heat can be discontinued when through with, while in cold weather a heating apparatus can be quickly connected in any room wired for electric lighting, for the purpose of supplementing the supply of heat, as in a nursery, dining room, library, sick room or wherever needed. This method does not vitiate the air of the room by absorbing the oxygen in it, as when gas, oil or coal are used. They also make Disk Stoves for light work, to be used anywhere. These are a few inches high and about 12 inches in diameter. When the utensils or heating apparatus are not in use the expense is stopped by cutting off the current, meters measuring what is used, the same as gas. This company have recently fitted over 2000 railroad cars with their heating apparatus, 200 of which belonged to the Atlantic avenue trolley system in Brooklyn.

PAGE, DENNIS & Co., 325 Broadway, New York, and Muskegon, Mich.: American Refrigerators. These Refrigerators are described as being charcoal and charcoal paper lined, made of solid ash, antique oak finish, furnished with solid brass locks and hinges. They are lined with polished zinc, have solid metal shelves, and the sides come

down to form legs. Illustrations show various styles and sizes of these goods, also the principle of the dry air circulation.

## Trade Items.

**E.** C. STEARNS & CO., Syracuse, N. Y., have been appointed exclusive selling agents for the Vanderbilt Sash Balance. They will carry in stock a full assortment of the different sizes of these goods, all orders for which will be promptly executed.

IN THEIR ADVERTISEMENT in this issue Kelley & McBean, Niagara Falls, N. Y., call the attention of the trade to their business as manufacturers of Dog Collars and Chains of all kinds, referring especially to the strength and cheapness of their goods.

EDWARD G. SHEPARD, 142 Chambers street, New York, has been appointed the sales agent for this territory of the Whipple Screwless Door Knob, recently illustrated and described in these columns. This improved Knob is made by Perry & Whipple Company, New Haven, Conn.

NATIONAL MFG. COMPANY, Worcester, Mass., makers of Wire Goods, have removed their headquarters in this city from 45 Cliff street to 103 Chambers street. A full stock will be carried with which to promptly supply the city and nearby trade. They have the first loft at the latter address, which will be in charge of their New York agents, W. H. Quinn & Co.

A RECENT ISSUE of the *Logan County Index*, published at Bellefontaine, Ohio, contains an article relating to the Hardware store conducted in that place by Plummer, Kalb & Guy. A history of the firm is given, together with a reference to the goods carried and the facilities for doing business.

THE FIRM OF WARNER BROS., Minneapolis, Minn., dealers in Hardware and Stoves, have been dissolved by mutual consent, R. L. Warner retiring. F. R. Warner will continue the business and settle all accounts of Warner Bros.

OUR READERS will observe the Special Notice in this issue, signed "South Africa," in which the advertiser announces his intention of residing permanently in South Africa and wishes to secure the agency for one or more American firms doing an export trade with that country in Hardware, Iron, Steel or Machinery.

FRANZ SWATY of Marburg, Austria, has appointed Charles J. Healy, 121 Chambers street, New York, sole agent for the United States and Canada for the sale of his Alumine Razor Hones, in regard to the cutting qualities of which special claims are made.

WE ARE ADVISED that in the case of the Putnam Nail Company vs. the Ausable Horse Nail Company, a decision has been rendered by the United States Circuit Court affirming the decision of the lower court, which, it will be remembered, was in favor of the Ausable Horse Nail Company.

A NEW HARDWARE STORE will be opened about March 1 at Onawa, Iowa. The business will be conducted under the style of J. R. Thurston & Son.

MARSHALL T. ECKFORD and TALLEY B. GRAVES, under the firm name of Eckford & Graves, have formed a partnership and will transact a general brokerage business at 54 and 56 East Alabama street, Atlanta, Ga.,

handling especially Hardware, including Carriage and Wagon. They will represent manufacturers direct to the trade. Messrs. Eckford & Graves are referred to as having a thorough knowledge of the Hardware business, acquired through many years of experience.

## Price-Lists, Circulars, &c.

**W**ILLIAMS MFG. COMPANY, Kalamazoo, Mich.: Catalogue of Tanks. A variety of styles of wooden Tanks is given, for use on railroads, in paper mills, in salt works, for manufacturing purposes generally and on buildings in connection with automatic fire extinguishers. The Tanks are made of thicknesses to suit and of Michigan white pine, Louisiana red cypress or California (cedar) redwood. The company furnish either timber or steel Towers, in case the Tank requires a separate support. The steel Tower frame was specially designed for them by the builders of the great Ferris Wheel, to insure as perfect a structure as possible. The company also make the Manvel Wind Mill, which can be placed on their Tank Towers where it is desirable to have independent pumping facilities for filling the tank.

BLESS & DRAKE, Newark, N. J.: Smoothing Irons. Illustrations show Ideal Irons, Mrs. Pott's Irons, Salamander Sad Iron, Self Heating Smoothing Iron, Self Heating Tailors' Irons, Common Sad Irons, Star Brand and Extra Finish Pressing Irons, Laundry Irons, Tailors' Geese, Flounce and Sleeve Iron, B. & D. Polishing Irons, Toilet Irons, Troy and Keystone Polishing Irons, and Iron Stands.

THE BROMWELL HOUSE FURNISHING GOODS COMPANY, Cincinnati, Ohio: Window Screens. Illustrations show Window Screens which slide on guide strips so as to be used over both lower and upper sash, but so arranged that they cannot be raised or removed except by those inside the house.

FREEMAN, DELAMATER & Co., Detroit, Mich.: Farming Tools, Builders' Hardware, &c. A spring catalogue of 84 pages illustrates Farm and Garden Tools, Builders' Hardware, Lawn Mowers, Refrigerators, Freezers, Shovels, Spades, Seeders, Post Hole Diggers, Screen Doors, Window Screens, Oil Cooking Stoves, Pumps, &c.

THE BLISH, MIZE & SILLIMAN HARDWARE COMPANY, Atchison, Kan.: Seasonable Hardware. A price current under date February, 1894, containing 64 pages, is devoted to illustrations and prices of Garden Tools, Shovels, Spades, Lawn Mowers, Wagon Hardware, Vises, Wheelbarrows, Clippers, Wringers, Window Screens, Spring Door Hinges, Curry Combs, Freezers, Refrigerators, Express Wagons, Fish Hooks and Lines, Clocks, Hollow Ware, &c.

THE AMIDON TOOL CORPORATION, Buffalo, N. Y.: An artistic pamphlet devoted to facts relating to the Amidon Corner Brace. Illustrations are given showing the Brace in use, boring in corners at floor and ceiling. The title page is as follows, with appropriate display: "At this instant he BORES me with some trick."—Shakespeare, Henry VIII.

CARY MFG. COMPANY, 5-9 Elm street, New York: Box Straps, Box Corners and Bung Fasteners. These goods are illustrated, and Box Strapping in coils is shown, with a frame by which it may be hung up ready for use.

**NEW JERSEY WIRE CLOTH COMPANY,** Trenton, N. J.: Galvanized Netting and Galvanized Farm and Lawn Fencing. A folder is devoted to a price list of these goods, with an illustration of Fencing. A separate folder gives the reason why the company's Standard Netting should engage the attention of the trade.

**A. J. HARWI HARDWARE COMPANY,** Atchison, Kan.: Price current of spring and summer goods. The 56 pages illustrate, with list prices, Garden and Farm Tools, Scythes, Shovels, Spades, Post Hole Diggers, Steel Hods, Wheelbarrows, Velocipedes, Tricycles, Pruning Tools, Lawn Mowers, Poultry Netting, Screen Doors and Windows, Spring Hinges, Oilers, Malleable Clevises, Refrigerators, Water Coolers, Washing Machines, Wringers, Gasoline Stoves, &c.

**GRAND CROSSING TACK COMPANY,** Grand Crossing, Chicago, Ill.: Export Catalogue H. The catalogue contains a list and illustrations of those goods which the company are at present shipping to their customers abroad, and shows how such goods are packed for export. It is remarked by the manufacturers that it is the first time in the history of the Tack business that such a catalogue has been printed and that goods have always been cut and packed for export trade in a different manner than for domestic trade, but that those differences have never before been clearly set forth.

**MINTER NUT COMPANY,** Worcester, Mass.: Finished and case hardened Hexagon Nuts. A folder is devoted to manufacturer's list, U. S. standard sizes and threads; special list thin Nuts, U. S. standard sizes and threads, except thickness, and Planer Nuts, U. S. standard sizes and threads, except thickness. Special Nuts are made by the company to order.

**E. C. ATKINS & Co.,** Indianapolis, Ind.: World's Fair Souvenir. The pamphlet gives views of their exhibit and a list of the articles exhibited, which included Circular and Cross Cut Saws, Mill Goods, Hand Saws, Saw Tools, Mill Tools and Specialties, the exhibit being made up of 729 articles.

**THE J. T. HENRY MFG. COMPANY,** Hamden, Conn.: Henry's Pruning or Sheep Toe Shears, Orange Clippers, Grape Shears, and Tree Pruners. A circular shows these goods in a dozen different styles, with prices. The company remark that their cheaper grade of Shears are all well and substantially made and are strong and durable.

**VICTOR MFG. COMPANY,** Newburyport, Mass.: Door Hangers, Rails, Fire Doors, Shutters, and Hardware specialties. Illustrations show Victor Door Hanger; Moody steel Door Hanger and Rail; Victor roller bushed Hanger; adjustable outside Stay Roll; inside Stay Roll; Victor Heel Nailing Jack; interchangeable lock Stencils; Victor Rotary Can Opener; Drive or Belt Punch; Leather Spring Punches; Rivet Burr Set; Revolving Clothes Reel; also a large line of automatic Fire Doors, Fire Shutters, and their trimmings.

**SANDWICH ENTERPRISE COMPANY** Sandwich, Ill.: Aerating Pumps. An illustration and description of the goods explain that the pump purifies foul and offensive cistern water and makes it sweet and wholesome, by forcing a stream of pure air down to the bottom of the cistern; the air immediately rising to the surface, and in its passage up-

ward agitates the water, while a large quantity of its oxygen is absorbed by the water.

**ERIE SPECIALTY MFG. COMPANY,** Erie, Pa.: Hardware and advertising specialties. The company's catalogue contains illustrations of their complete line, including Automatic, Quick and Easy and Improved Cork Pullers, Cork screws, Perfected Lemon Squeezer, Wood Lemon Squeezer, Beverage Mixer and Milk Shake, Double Cutter Ice Shave, Hand Ice Shave, Cigar Cutters, Cigar Box Openers, Tobacco Cutters, Cigar Cutter and Lighter Combined, Cigar Lighters, and Advertising Cards.

**PHOENIX CASTER COMPANY,** Indianapolis, Ind.: Martin's Patent Caster. Their 1894 illustrated catalogue and price-list shows these Casters for use on chairs and light furniture, tables, desks, &c.; bedsteads, bookcases, sideboards, &c.; heavy furniture and refrigerators, showcases and light trucks, store trucks and ice chests, trucks and magazine boxes, warehouse trucks; also Bracket Casters, Socket Chair Casters, and Socket Casters for bottling, packing, sampling and other heavy tables.

**A. TREDWAY & SONS HARDWARE COMPANY,** Dubuque, Iowa: Spring circular No. 14, March, 1894. The pamphlet contains 56 pages, devoted to Farm and Garden Tools, Hay and Corn Knives, Scythes, Lawn Mowers, Shovels and Spades, Screen Doors, Window Screens, Spring Hinges, Fence Wire, Post Hole Diggers, Hay Tools, Washing Machines, Oil and Gasoline Cans, Ammunition, Horse Brushes, Curry Combs, Carpenters' Tools, Shelf and Heavy Hardware, Blacksmiths' Supplies, &c.

## It Is Reported—

That S. S. Edsall's Hardware store, at Bowmanville, Ont., was burned to the ground on the 8th ult. Mr. Edsall's stock was valued at \$6000, and was insured for \$4000.

That the Hardware store of A. O. Martin, Marion, Ind., was entered by burglars on the 11th ult. and \$25 worth of Revolvers carried off.

That the Hardware and Implement firm of Tinsley & Martin, Crawfordsville, Ind., has been dissolved by mutual consent, Mr. Martin retiring on account of ill health. Mr. Tinsley will continue the business.

That the stockholders of the Warren Hardware Company, Warren, Ohio, held their annual meeting on the 12th ult., when they elected the following directors: W. S. Kernohan, William Wallace, Isaac Kirk, H. C. Christy, H. C. Bradley, W. De P. Knowlton, W. D. Packard, J. C. Shook and F. E. Caldwell. The past year was a prosperous one for the company, as indicated by the dividend of 6 per cent. that was declared.

That D. L. Esterly's Sons, Hardware merchants, of Pottsville, Pa., are intending to remodel their store with a view to materially enlarging it. They have purchased additional property in the rear of the store, upon which they will erect a brick warehouse in a short time. They have not yet completed arrangements for the new building, but propose making it a commodious structure. This firm was established in 1845 by George H. Stichter, who in 1847 took D. L. Esterly into partnership with him, the business being conducted under the style of Stichter & Esterly. In 1852 Mr. Esterly bought out the interest of his partner and continued the business in his own name. The busi-

ness has been conducted by Mr. Esterly's sons since his death in 1888.

That the Hardware store of Fish & Kronenberg, Hamburg, N. Y., suffered a heavy loss at the hands of burglars on February 6. Over \$200 worth of Silverware and fine Cutlery was taken away by the thieves.

That C. A. Brusle's warehouse, at Plaquemine, La., was destroyed by fire on the 9th ult. It was situated in the rear of his store and was used for the storing of Oils, Paints, &c.

That Henry Buchanan, Durand, Wis., has disposed of his stock of Hardware to E. N. Rounds and W. G. Stoltz.

That C. K. Lawson has bought an interest in the Hardware store of C. J. Hamot, Hastings, Neb. The firm style will be Lawson & Hamot.

That the store of the F. Ozanne Stove & Hardware Company, Memphis, Tenn., was entered by burglars on the 5th ult. and about \$100 worth of goods stolen.

That Millhouse Bros., Galena, Ill., have moved their stock of Hardware into the Cloran Building, which has undergone extensive improvements, including new fixtures and a plate glass front.

That W. James has sold his Hardware store, at Point Pleasant, Ohio.

That W. A. Johnson, Streator, Ill., has sold John Albion a half interest in his Hardware business. The firm name will be Johnson & Albion.

That James Hemphill, late of the Hardware firm of Deuth, Hemphill & Co., Forreston, Ill., will, about March 1, open a new Hardware store at Polo, Ill.

That Joseph Parker and James Criswell have purchased the Hardware stock of W. C. Andes & Co., Mound City, Mo.

That C. E. Bailey is erecting a large two-story store building at Fraser, Ia., and will open about March 1 a full line of Hardware and furniture.

That the Bedford Hardware Company, Bedford, Ia., have been incorporated, with a capital stock of \$20,000. The incorporators are W. M. Ramsay, I. F. Williams and W. W. Hyde.

That the annual meeting of the Marshall-Weils Hardware Company, Duluth, Minn., was held on the 7th ult. The old officers were all re-elected.

That John W. S. Pierson, a well-known Hardware merchant and one of the most public spirited citizens of Stanton, Mich., has donated the use of a large hall in the Phoenix Block for a gymnasium and reading room. He has furnished it with all the modern gymnasium appliances and hired a competent instructor from Detroit. Public lectures will be given twice each month by leading men of the State.

That the wholesale and retail Hardware establishment of the Roberts, Willis & Taylor Company, Sherman, Texas, was burglarized on the 7th ult.; \$500 worth of revolvers was taken.

That J. W. Dean has opened a Hardware store at Bellefontaine, Ohio.

That James White, Hardware merchant, of Westfield, Ill., has sold his store to Biggs & Ross.

That Welsh Bros., Bennington, Kan., have sold their Hardware business to W. H. Washburn and Robert A. McConnell.

That J. Dunford has sold a half interest in his Hardware store to Mr. Pollitt. The new firm style will be Dunford & Pollitt.



That John Augustine and J. F. Swanson have just opened a new Hardware store at Red Wing, Minn. The style is Augustine & Swanson.

That the Fulcher-Harris Hardware & Supply Company, West Pullman, Ill., have been incorporated, with a capital stock of \$10,000.

That all the Hardware stores of Oakland, Cal., have agreed to close at 6 o'clock every evening in the week except Saturday, when they will keep open until 9.

That Charles S. Clifford will open his new Hardware store at Dover, N. H., March 1.

That the annual meeting of the Morris Hardware Company, Youngstown, Ohio, was held on the 12th ult. The following Board of Directors was elected for the ensuing year: H. M. Garlick, W. J. Hitchcock, J. H. Morris, W. J. Whitworth, L. E. Cockran, J. L. Botsford and Hugh B. Wick. The board organized by electing H. M. Garlick president, W. J. Hitchcock vice-president, J. M. Morris general manager, and W. J. Whitworth secretary and treasurer.

That Hendrix Bros.' Hardware store, at Brazil, Ind., was burglarized on the 4th ult. A number of Pocket Knives, Razors, &c., were taken.

That the Hardware store of Ketcham & Wilson, Plymouth, Ind., was destroyed by fire on the 4th ult. The building was a large brick structure. The loss exceeds \$10,000, partly covered by insurance.

That the Hardware store of Francke & Schindler, Indianapolis, Ind., was robbed of \$100 worth of Revolvers on the 9th ult.

That the Hardware firm of Trowbridge & Wakeman, Riverside, Cal., have been dissolved, the junior partner selling out to M. L. Coleman of Lansing, Mich. The name of the firm has been changed to the Trowbridge Hardware Company, Harvey Trowbridge continuing as manager.

That Mr. Anderson has opened a new Hardware store at Burnside, Iowa.

That Mrs. H. Snibley, in the Hardware business at Hollister, Cal., has sold out to Smith & Chappell.

That Perry Swickard has recently opened a Hardware store at Mattoon, Ill.

That the Hardware and Implement firm of Nobes & Mount, Darlington, Ind., have been succeeded by W. B. Mount.

That the Gates Hardware Company have been organized at Springfield, Mo.

That Chapman & Wheeler have entered the Implement business at Bromfield, Neb.

That J. A. Cupler will open a Hardware store at Jamestown, N. Y., about March 1.

That Johnson Bros. have sold out their Hardware business at Grinnell, Iowa.

That J. V. White of Marshalltown, Iowa, has purchased a Hardware store at Hubbard, Iowa.

That the Denver Stove & Hardware Company have been incorporated at Denver, Col., with a capital stock of \$100,000. The incorporators are George Ross-Lewin, Thomas Keeley and Walter Briggs.

That the Hardware store of J. Blakey & Co., Ennis, Tex., was entered by thieves on the 2d ult., who got away with about \$200 worth of Pocket Knives and Pistols.

That L. Turner has sold out his stock of Hardware at Columbia, S. D.

That the Implement warehouse of A. Lundberg & Co., Wausa, Neb., was destroyed by fire on the 2d ult. Loss, \$3000. Fully covered by insurance.

## Paints and Colors.

*It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.*

**White Lead.**—Depression in prices is still the chief feature in the market. Buyers are slow and extremely conservative, chiefly for the reason that requirements have been anticipated to a great extent. Competition meanwhile continues very keen, and rumor has it that sales have been made at lower than any given for publication up to the present time. Best brands of Dry White Lead are at 4½¢ in 5 ton lots, and are said to have been sold at a fraction less, while 4¢ would seem to be about all that the inferior kinds will fetch at the moment. Lead in Oil is not as low relatively, but the market is still very unsettled, with 5¢ named in a few instances for round lots and 5½¢ @ 5½¢ for jobbing quantities of the leading brands. Mixed Leads are practically unsalable, except at sacrifice prices.

**Red Lead.**—In American brands there is little doing and the demand is much smaller than usual at this season of the year. Buyers are not inclined to purchase round lots in view of the sharp competition among various makers. Values are nominal for car lots at 5¢ @ 5½¢ as to brand and quantity. For jobbing parcels the price ranges from 5½¢ upward, as to size of the order. There is very little inquiry for German pending the unsettled condition of the tariff. Values are nominal at 6¢ @ 6½¢, as to make, quantity and date of delivery.

**Litharge.**—In common with other products of the corrodors, this article continues unsettled in price and the cheapness fails to stimulate business perceptibly.

**Orange Mineral.**—The trade in foreign brands has been on a rather small scale and the demand is not as good as it was last week. Prices have undergone no radical change, but seem to lean more in buyers' favor. Domestic product is selling in moderate quantities at about former prices.

**Zincs.**—There has been some increase in orders for domestic Oxide, but the movement is hardly up to the average for the season and there are some indications that the cheapness of White Lead has more or less effect, particularly upon grinders' purchases. The former range of prices is quoted, but the market shows rather weakish tone. In foreign brands there has been no change of importance and sales are just now running quite light.

**Colors.**—Trade in the leading lines of Dry Colors has improved somewhat, but there is hardly the average business for the season. Colors in Oil have met with somewhat better sale, chiefly for delivery during the spring season. Few and only unimportant changes in prices have taken place.

## Oils and Turpentine.

**Linseed Oil.**—The market is very firm under the influence of better general demand, coupled with higher cost of Seed and the recent loss of a large mill by fire. City crushers have taken only small orders at 52¢, and offer very in-

differently. Sellers of Western brands are quite as stiff. Neither will sell at present prices for delivery further ahead than 30 days.

**Cotton Seed Oils.**—Only a moderate business has been done in the crude products, but this was sufficient to keep prices steady. Refined has also moved rather slowly, but at quite steady prices. The general line of prices is about the same as ruled a week ago.

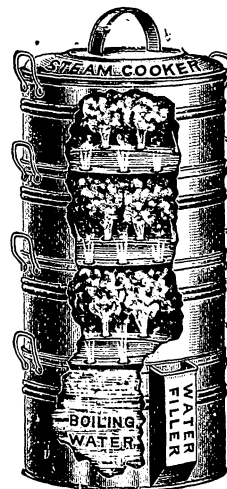
**Lard Oil.**—A seasonably fair business has been effected and the demand is better if anything than the average for several weeks. Prices have undergone hardly any change and the market shows very steady tone.

**Fish Oils.**—No new features have developed in the position of the market for crude Sperm, Whale or Menhaden Oils. Manufacturers, therefore, quote former prices for the pressed and bleached product. The demand has continued slow.

**Spirits Turpentine.**—Business has been moderate, but with comparatively little accumulation of supplies in first hands, prices have ruled fairly steady, closing at about 31½¢ for regular and 32¢ for machine barrels.

## Pyramid Steam Cooker.

The cut here shown represents a steam cooker offered by Silver & Co., 304-310 Hewes street, Brooklyn, and 20 Warren street, New York. The cooker is made of IX tin, buffed bright on the outside,



Pyramid Steam Cooker.

each cooker having one boiling and three cooking apartments. The different vessels can be used separately, as many at one time as is desired. The steam openings around the edge of each vessel are located in depressions or gutters, allowing the condensed steam to find its way back to the lower vessel along the sides rather than down the center and through other cooking foods. The manufacturers guarantee the device to cook an entire dinner of meats, vegetables, puddings, &c., at one time without attention and without imparting the flavor of one to the other; to economize nearly one-half in fuel and to be steamless and odorless and not to mingle the flavors. The steamer is made in three sizes: No. 1, vessels 8 inches in diameter, holding 2 quarts each; No. 2, vessels 9 inches in diameter, holding 3 quarts each, and No. 3, vessels 10 inches in diameter, holding 5 quarts each.



### Liberty Bell Match Safe and Ink-stand.

The Enterprise Mfg. Company, Philadelphia, Pa., are putting on the market a match safe and ink stand, representing in form the Liberty Bell, as shown

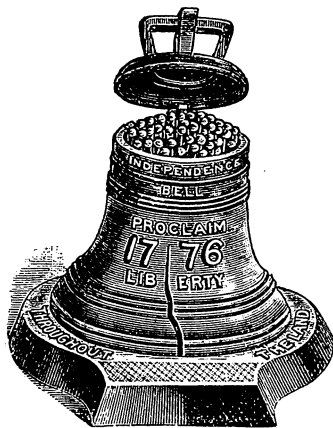


Fig. 1.—Liberty Bell Match Safe.

in Figs. 1 and 2. They are handsomely bronzed and painted, and have been designed because of their unique and

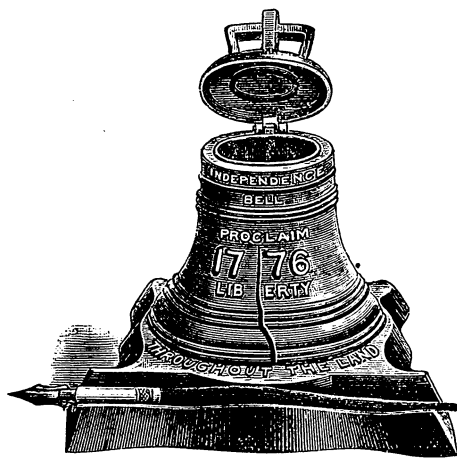
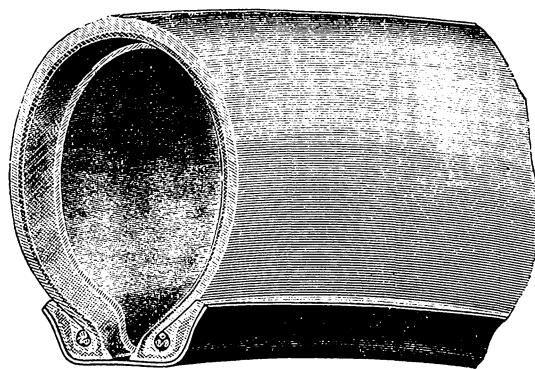


Fig. 2.—Liberty Bell Ink-Stand.

novel appearance, and also by reason of their shape and form, which is particularly suitable for use in the counting room, store, factory and household.

### Keystone Pneumatic Detachable Tire.

The accompanying cut represents the Keystone pneumatic detachable



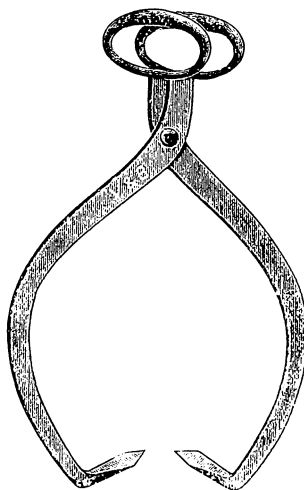
Keystone Pneumatic Detachable Tire.

tire, introduced by the Erie Rubber Company of Erie, Pa. The novel feature of the tire is in the method of fastening it to the rim of a wheel, no

cement being used. The air tube cover has a stiff flap which turns up toward the body of the tire, the fold forming a cavity circular in shape. The tire being placed in position on a wheel, a piece of cord is passed three times around the cover in such a manner as to slip over the edge of the flap and into the cavity in the fold, and the ends twisted or spliced; three knots are also made in each end of the cord. Upon inflation of the air tube the cover is expanded, the cord acting as a dead stop for expansion and joining the edge of the flap to the rim in such a manner as to make removal of the tire impossible without deflation of the air tube and removal of the cord. The air tube is made wholly of rubber without cloth or threads, and, it is claimed, possesses a peculiar feature in that it will stretch only in a longitudinal direction. The tire is manufactured under the patent owned by J. G. Mooney.

### The V. & B. Solid Steel Ice Tongs

The cut herewith given shows the new ice tongs which have just been put on the market by the Vaughan & Bushnell Mfg. Company, 877 to 887 Carroll

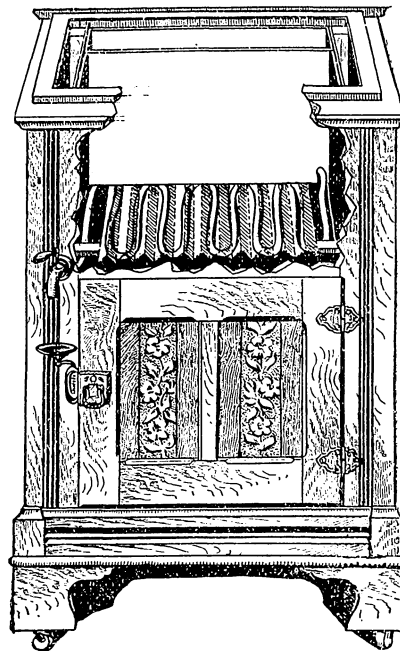


The V. & B. Solid Steel Ice Tongs.

avenue, Chicago. These tongs are drop forged of solid cast steel, with no weld whatever. The handles are not only an integral part of the tongs, but they are also by this method made of a more satisfactory shape. The upper portions of the rings are swelled to fit the palms of the hands and give the holder a

### National Refrigerator.

Page, Dennis & Co., 325 Broadway, New York, are introducing the National refrigerator, as here shown. They are manufactured under recent letters patent at their factories in Muskegon, Mich., shipments being made from either address. The line is an improvement on the American pattern long made by them, consisting in the arrangement and location of the porcelain lined water tank for supply-



Sectional View of Water Tank and Ice Chamber of the National Refrigerator.

ing cooled water, together with the piping seen in the cut. This style has been perfected largely for domestic use where ice is expensive, as well as for exportation to warm countries. The tank is placed at the back of the ice chamber instead of at the end, giving about double the capacity, besides affording a clear way in putting in the ice. Cooled drinking water is drawn at the faucet through parallel lines of block tin pipe, which, being directly under the ice, is further refrigerated. A tight cover to the tank keeps the water from being contaminated by food odors. The corrugated ice rack slopes rearward, thus keeping the ice continually against the tank by gravitation. The side frames of the refrigerator run clear to the bottom, giving a firm support for the casters. The boxes are made in both soft and hard woods, and for each size a mirror backboard or top is made, which, placed on the refrigerator, makes of it a sideboard. These tops are interchangeable and can be ordered at any time.

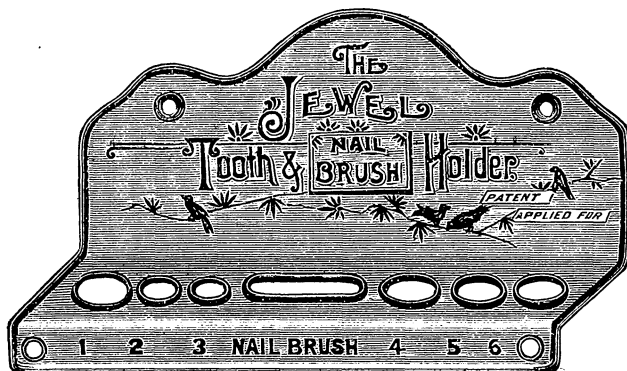
### Girls' Ball Bearing Tricycles.

The Toledo Metal Wheel Company, Toledo, Ohio, are introducing a ball bearing tricycle, the Perfection, for the use of girls. A prominent feature of these machines is that all axle bearings are ball bearing, thus reducing the friction, designed to make them propel as easily as a bicycle. The axles are all made of case hardened steel, to prevent their wearing at bearing points. On the tricycle is also introduced a new spring for seats, which, it is stated, is adjustable, simple in construction,

and which will not get out of repair. The frames of the machines are black, with C plate oval iron or rubber tire wheels.

#### The Jewel Brush Holder.

Keen & Hagerty, Baltimore, Md., are introducing a holder for tooth and nail brushes, as illustrated herewith. The holder is of metal, arranged to hang against the wall, to hold any sized tooth brush and one nail brush. Each tooth brush opening is numbered, to keep the brushes separate, preventing any possi-

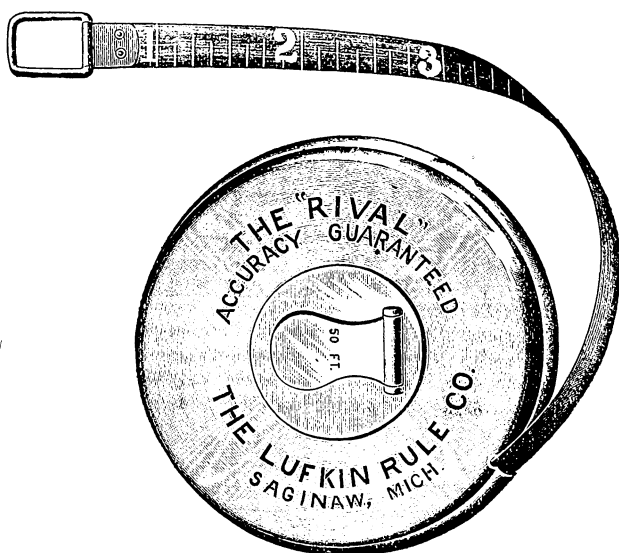


*The Jewel Brush Holder.*

bility of getting the wrong one. The manufacturers remark that the ornamentation is lithographed on the surface of the holder and will not peel or wear off.

#### Rival Steel Measuring Tape.

The Lufkin Rule Company, Saginaw, Mich., are offering the steel measuring



*Rival Steel Measuring Tape.*

tape illustrated herewith. The tape itself is described as being made of a low priced steel of American production, but of good quality, and is marked only on one side in feet, inches and eighths. The case is described as being brass, nicely nickel plated and as compact and durable. The winding drum is of somewhat larger diameter than the company's Reliable tape, which gives a good long crank and winds easily, notwithstanding it has not the advantage of an extension handle, but the handle folds nearly flush with the case. The tape is put on the market to meet the

demand from contractors, builders, masons and others who appreciate the value of a steel measuring tape and who do not feel inclined to invest in the higher priced article. The manufacturers state that while the tape is sold at a comparatively low price yet none of its practical features have been sacrificed and that it is a first-class article, fully guaranteed by them.

#### Goodell's Hand Drill No. 4.

The H. H. Mayhew Company, Shelburne Falls, Mass., are now offering

another of Goodell Bros.' tools in the shape of a geared hand drill, which is to be known as the Goodell hand drill No. 4. In this tool is embodied the same arrangement for holding the drill points in the handle as is used on the Goodell automatic drill No. 3. The frame is of malleable iron and is referred to as strong and light. Both gears are cut and run smoothly without hitching. The steel chuck is well fin-

ished, with knurled nut and three hardened steel jaws, which, it is stated,

will hold equally well the fluted drill points in the handle or any twist drill from  $\frac{3}{8}$  down to No. 80.

#### The Fox Improved Safety Razor.

E. Lothar Schmitz, 92 Reade street, New York, is offering an improved form of the Fox safety razor, as shown in Figs. 1 and 2. A leading feature of



*Fig. 1.—Fox Safety Razor, Full Size Cut.*

the new razor not seen in the cut is the size of the partitions and shape of the openings through which the beard passes. While the partitions, or guards, are the same in number as heretofore, they are more delicate in formation and different in shape, producing, it is stated, much better results, while adding considerably to the finish of the article. The general appearance of the whole frame has been bettered. Two styles are made. One is embossed and silver plated and has two gilt thumb screws. The other is plain, all nicked and finely polished. One handle now serves both for shaving and stropping. This is of wood, black enameled. The attachment for holding blade in stop-



*Fig. 2.—Stropping Attachment, Full Size.*

ping, seen in Fig. 2, is slipped into the metal socket of the handle, which is arranged to receive it and hold firmly.

### Bourke's Extension Handle Coupling.

The cut herewith shown represents an extension handle coupling, offered by the Bourke Mfg. Company, Youngstown, Ohio. The handles are fastened into each end of the coupling by means

meshes of the goods washed, and that by the united action of condensed air, steam and suds the material is cleansed quicker than by other processes. The point is made that the corrugated bottom and corrugated breakers slush the water rapidly; and that after washing two hours in warm weather the hands

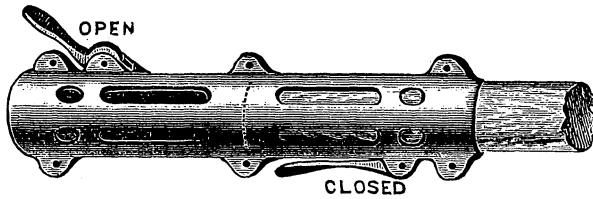


Fig. 1.—Bourke's Extension Handle Coupling.

of cam levers, which imbed themselves in the groove A of the handle, as in Fig. 2, making it impossible, it is stated, for the handles to come out until the levers are raised, when the handles may be removed and used for other purposes as desired. Fig. 1 shows the cam lever, both closed as when holding the handle in place and also when open and the handle removed. The

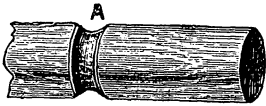
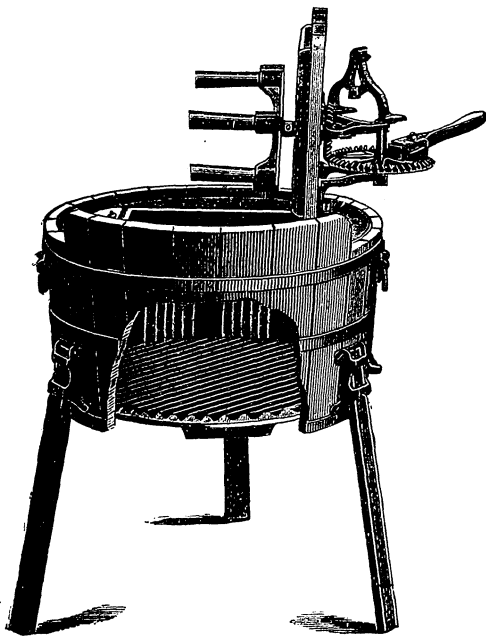


Fig. 2.—Grooved Handle for Receiving Cam.

holder is designed to extend handles when long reaches are necessary. The point is made that the holder is superior to tin sockets, as it is made entirely of malleable iron and is indestructible.

### The Bruner Cedar Washing Machine.

The accompanying cut represents a cedar washing machine put on the market by the Bruner Company,



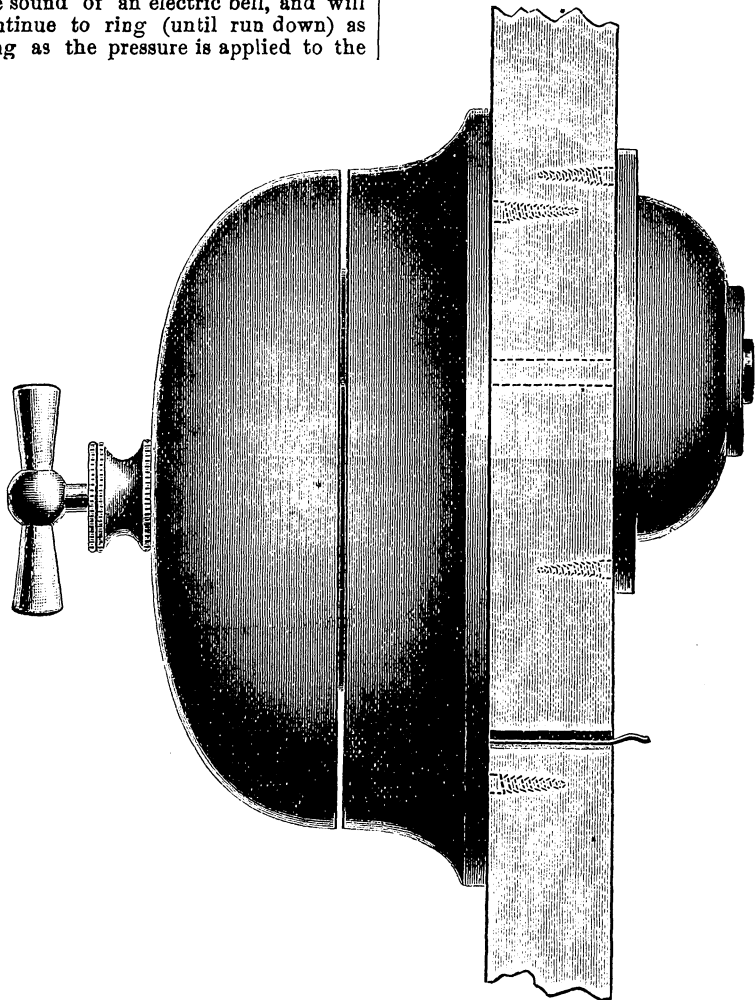
The Bruner Cedar Washing Machine.

Springfield, Ohio. The manufacturers state that the principle upon which the machine works is the expanding of the

cannot be held in the suds. The machine is made in styles A, B and C.

### Electric Ring Door Bell.

Sargent & Co., 35 Chambers street, New York, are offering a continuous electric ring door bell, as here illustrated. This is operated by means of a push button, as shown in the cut, or can be worked with a direct wire and pull, as indicated by the projecting wire under the push button. It needs occasional winding, which is done with the T-handle, seen at the left. It gives the sound of an electric bell, and will continue to ring (until run down) as long as the pressure is applied to the

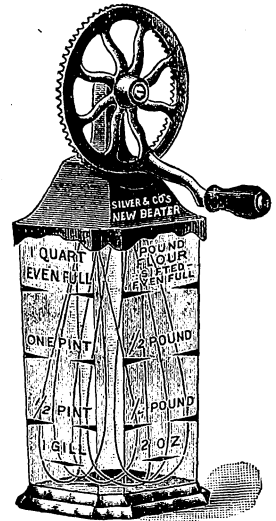


Continuous Electric Ring Door Bell.

push button or the wire drawn by the bell pull. This is accomplished by a clock mechanism inside. The bells are packed one in a box, and finished in nickel, Yeddo bronzed and antique copper.

### New Beater and Dessert Maker.

Silver & Co., 304-310 Hewes street, Brooklyn, and 20 Warren street, New York, are offering a beater and dessert



New Beater and Dessert Maker.

maker, as shown herewith. The receptacle is of glass graduated, and may be used separately for measuring and weighing liquids, sugar, flour, &c. The top is of tinned iron, with a wheel 4

inches in diameter. The wire beaters are rigid at the bottom, being bound together by wire. The device is a combination beater and measure for beating eggs, whipping cream and for making cakes, custards, &c.

# Current Hardware Prices.

FEBRUARY 28, 1894.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

The character @ is used to indicate a range of price; thus discount 50&10@50&10&5 % signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

## Adjusters, Blind—

Domestic.....\$ doz \$3.00, 83%&34%&10%  
Excelsior.....\$ doz \$10.00.....50&10&5%  
North's.....\$ doz.....\$11.11@10%  
Zimmerman's—See Fasteners Blind.

## Ammunition—See Caps, Cartridges, Shells, &c.

## Anvils—

### American—

Eagle Anvils, 14 in. 15@15&5%  
Horse shoe brand, Wrought.....11@11%  
Moore & Barnes Mfg. Co.....33&34%

### Imported—

Armstrong Mouse Hole.....10%&11%  
S. & H., machine finished.....10%&11%  
Trenton.....10%&10%  
Wilkinson's.....10%&11%  
Peter Wright's.....11%&11%

## Anvil Vise and Drill—

Allen Anvil and Vise \$3.00.....40&10%  
Cheney Anvil and Vise.....25%  
Millers Falls Co., \$18.00.....20%  
Star.....45&56%

## Apple Parers—See Parers

## Apple, &c.

## Augers and Bits—

Boring Machine Augers.....70@70&10%  
Car Bits, 12-in. twist.....60%  
Common Augers and Bits.....70@70&10%  
Cincinnati Bell-Hangers' Bits.....30&10%  
Forstner Pat. Auger Bits.....15%  
Jennings' Pattern Car Bits.....40%  
Jennings' Pattern Auger Bits.....60%  
C. E. Jennings & Co., No. 10, extension  
lip.....40%  
C. E. Jennings & Co., No. 30.....60%  
C. E. Jennings & Co., Auger Bits, set  
32% quaters, No. 5, \$5; No. 30, \$3.50.....25%  
Russell Jennings' Augers and Bits.....25&10%  
Lewis' Patent Single Twist.....45%  
L'Hommedieu Car Bits.....15&10%  
Pugh's Black.....20%  
Pugh's Jennings Pattern.....30%  
Snell's Bits.....60&5%

## Bit Stock Drills—

Cleveland.....60&10&5%  
Cincinnati, for wood.....30&10%  
Cincinnati, for metal.....45&10%  
Morris Twist Drills.....50&10&5%  
New Process Twist Drill Co.....50&10&5%  
Standard.....60&10&5%  
Syracuse, for metal.....50&10%  
Syracuse, for wood (wood list).....30&10&5%

## Expansive Bits—

Clark's small, \$18; large, \$20.....35&5&10%  
Ives' No. 4, \$ doz \$30.....40%  
Steer's No. 1, \$28; No. 2, \$18.....35&40%  
Stearns' No. 2, \$48.....20%  
Swan's.....40%

## Gimlet Bits—

Bee.....25&25&5%  
Common.....\$ doz \$2.75@3.25  
Diamond.....40&10%  
Double Cut.....30&10%  
Ct. Valley Mfg. Co.....30&10%  
Hartwell's.....\$ gr. \$10.00.....40&10%  
Douglass'.....40&10%  
Ives.....60&60&10%  
Shepardson's.....45&45&10%

## Hollow Augers—

Bonney's Adjustable, \$ doz \$48.....60%  
Cincinnati Adjustable.....25&10%  
Cincinnati Standard.....25&10%  
Douglass'.....33%&33%&10%  
French, Swift & Co. (Becher).....33%&33%&10%  
Ives'.....33%&33%&10%  
Ives' Expansive, each \$4.50.....50&5%  
Stearns'.....20&10%  
Universal Expansive, each \$4.50.....20%  
Wood's.....25&25&10%

## Ship Augers and Bits—

L'Hommedieu's.....15&10@15&10&5%  
Snell's.....25&25&10%  
Snell's Ship Auger Pattn' Car Bits.....15&10@15&10&5%  
Watrous'.....25&25&10%

## Awl Hafts—See Hafts, Awl.

## Awls—

Awls, Sewing, Common.....\$ gr. 85¢@90¢  
Awls, Should. Peg.....\$ gr. \$1.50@1.55  
Awls, Pat. Peg.....\$ gr. 35¢@38¢  
Awls, Shouldered Brad.....\$ gr. \$1.30@1.40  
Awls, Handled Brad.....\$ gr. \$2.50@3.00  
Awls, Handled Scratch.....\$ gr. \$4.00@4.50  
Awls Socket Scratch.....\$ doz. \$1.00@1.20

## Awl and Tool Sets—See

## ts, Awl and Tool.

## Axes—

Plain. Beveled.  
First quality, best brands.....\$7.00 \$7.50  
First qual., other brands.....6.50 7.00  
Second quality.....5.50 6.00

## Axle Grease—See Grease,

## Axle.

## Axes—

No. 1.....3%&4%  
Nos. 7 to 14.....70%  
Nos. 15 to 22.....47%  
Nos. 19 to 28.....70%  
Concord Axes, loose collar.....\$4¢@5¢  
Concord Axes, solid collar.....5¢@6¢

## Bag Holders—See Holders,

## Bag.

## Balances—

Sash—  
Pullman.....33%  
Spring—  
Spring Balances.....40%  
No. 2000 20 30  
Chatillon, \$ doz.....\$0.80 0.95 1.75 net  
Chatillon Straight Balances.....40%  
Chatillon Circular Balances.....50&10%

## Barb Wire—See Wire, Barb.

## Bars—

Crow—  
Cast Steel.....\$ doz \$3%  
Iron, Steel Points.....\$ doz \$3%

## Basins, Wash—

Standard Fiberglass, No. 1, 10% in., \$1.80;  
12-inch, \$2.00; 13% inch, \$2.50; 15-inch,  
\$3.00.

## Beams, Scale—

Scale Beams, List Jan. 12, '82.....50&10%  
Chatillon's No. 1.....50&10&5%  
Chatillon's No. 2.....50%  
Custer's.....33&34%

## Beaters—

### Egg—

Bryant's.....\$ gross \$14.00  
Double (H. & R. Mfg. Co.), \$ gross, No. 0  
\$12.00; No. 1, \$15.00; No. 2.....\$36.00  
Dover.....\$ doz \$1.00@1.20  
Dover (Standard Co.).....\$ doz \$1.00  
Duplex (Standard Co.).....\$ doz \$1.00  
Duplex Extra Heavy (Standard Co.).....\$ doz \$3.50  
Easy (H. & R. Mfg. Co.).....\$ gr. \$12.00  
Improved Acme (H. & R. Mfg. Co.).....\$ gr. \$9.00  
Silver & Co.....\$ doz \$5.50  
Spiral.....\$ gr. \$4.25 @ \$4.50  
Triple (H. & R. Mfg. Co.).....\$ gr. \$16.50

## Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1;  
No. 2, \$2.....20%

## Bells—

### Cow—

Common Wrought.....60&10%  
Kentucky Durham.....70&10%  
Kentucky, Sargent's list.....70&10%  
Kentucky, "Star".....70&10%  
Texas Star.....50&10@50&10&5%  
Western, Sargent's list.....70&10%

## Door—

Crank, Brooks'.....50&10&2%  
Crank, Cone's.....40%  
Crank, Connell's.....20&10%  
Gong, Abbe's.....35%&10%  
Gong, Barton's.....40&10@50%  
Gong, Yankee.....45&10%  
Lever, R. & E. Mfg. Co.'s.....60&10&2%  
Lever, Sargent's.....60&10%  
Lever, Taylor's Bronzed or Plated.....net  
Lever, Taylor's Japanned.....25&10%  
Pull, Brook's.....60&10&2%

## Electric—

Bigelow & Dowse.....20%  
Wollensak's.....20%

## Hand—

Extra Heavy Brass.....70%  
Light Brass.....70&10@70&10&5%  
Silver Chime.....33%&10%  
White.....70%  
Globe Cone's Patent.....25&10@35%

## Miscellaneous—

Call.....45&50%  
Farm Bells.....\$ doz \$3%  
Steel Alloy Church and School Bells.....40%

## Bellows—

Blacksmiths'.....60&10&5@60&10&10%  
Hand Bellows.....60&10&5%  
Molders'.....40&10@50%

## Belting, Rubber—

Common Standard.....75@75&10%  
Extra.....60&10@60&10&10%  
Standard.....70@70&10&10%  
N.Y.B.&P. Co., Carbon.....60&60&5%  
N.Y.B.&P. Co., Para.....40&40&5%

## Bench Stops—See Stops, Bench

## Benders and Upsetters,

## Tire—

Detroit Perfected Tire Bender.....15%  
Green River Tire Benders and Upsetters.....20%  
Stoddard's Lightning Tire Upsetters.....15%

## Bits—

Auger, Gimlet, Bit Stock Drills, &c.,  
see Augers and Bits.

## Bit Holders—See Holders.

## Blind Adjusters—See Ad-

## justers, Blind.

## Blind Fasteners—See Fasten-

## ers, Blind.

## Blind Staples—See Staples,

## Blind.

## Blocks—

Cleveland Block Co., Mal. Iron, 50&10@60%  
Moore's Novelty, Mal. Iron.....50%  
Sure Grip Steel Tackle Blocks.....25%  
See also Machines, Hoteting.

## Bolts—

### Carriage, Machine, &c.—

Com. list June 10, '84.....80&10@80&10&5%  
Genuine Eagle, Norway, list Oct. '84.....80&5@80&10%  
Eagle, Norway, list Oct. '84.....80&10@80&10&5%  
Phila. pattern, list Oct. 7, '84.....80%  
R.B. & W., old list.....70%  
Bolt Ends, list Jan. 1, 1890.....80&10@80&20%  
Machine, list Jan. 1, 1890.....80&10@80&20%

### Door and Shutter—

Cast Iron Barrel, Square, &c.....70&10%  
Cast Iron Chain (Sargent's list).....65&10%  
Cast Iron Shutter Bolts.....70&10%  
Ives' Patent Door Bolts.....60&10@60&10&5%  
Wrought Barrel.....70&10@75%  
Wrt B. K. Flush, Common.....65&10%  
Wrt Shutter, Brass Knob.....50&50&5%  
Wrt Shutter, Sargent's list.....60&10%  
Wrt Shutter, all Iron, Stanley's.....60&10@60&10&10%  
Wrought Square.....70&10@75%  
Wrt Sunk Flush, Sargent's list.....60&10%  
Wrt Sunk Flush, Stanley's list.....50&10&5%

### Stove and Plow—

Plow.....60&10&5@60&10&10%  
Stove.....60&10@60&10&10%  
R. B. & W., Plow.....55%

### Tire—

Common, list Feb. 28, '83.....65@65&10%  
American Screw Company  
Norway, Phila., list Oct. 16, '84.....75%  
Eagle, Phila., list Oct. 16, '84.....80%  
Phila., list Oct. 16, '84.....80%  
Bay State, list Feb. 28, '83.....65%  
Port Chester Bolt and Nut Company:  
Empire list Feb. 28, '83.....65%  
Keystone, Philadel., list Oct. '84.....75%  
Norway, Phila., list Oct. '84.....75%  
R. B. & W., Philadel., list Oct. 16, '84.....80%

### Borers, Tap—

Common and Ring.....20&10%  
Clark's.....33%&33%  
Enterprise Mfg. Co.....20%  
Ives' Tap Borers.....33%&33%

### Boring Machines—See Ma-

### chines, Boring.

### Bow Pins—See Pins, Bow.

### Boxes, Wagon—

Per doz.....23%  
Boxes, Miter.

Spiker's Excelsior, 3 in. \$7.50, 4 in  
\$8.50, 5 in. \$13.00, 6 in. \$15.00.....20%

### Braces—

American Bit Brace and Tool Co.  
Nos. 10, 12, 20.....60&10%  
Nos. 11, 21, 24, 27.....70&10%  
Nos. 12, 25, 28.....60&10&5%  
Nos. 13, 26, 36, 37.....70&10&5%  
Amidon's  
Barker's Imp'd Plain.....75&10@80%  
Barker's Imp. Nickeled.....65&10@70%  
Ratchet.....75&10@80%  
Eclipse Ratchet.....40&10%  
Corner Brace.....40&40&10%  
Universal, 8 in., \$2.10; 10 in. \$2.25  
Buffalo Ball.....\$1.10@1.15  
Barber's.....50&10%  
Bartholomew's  
Nos. 25, 27 and 30.....50&10@60&5%  
Nos. 27, 118, 119.....70&10&5%  
Common Ball, American.....\$1.00@1.10  
Davis Patent.....60&10%  
Fray's Genuine Spotted.....50&5@50&10%  
Fray's Nos. 70 to 120, 81 to 128, 207 to 414  
60&10%  
Ives' New Haven Novelty.....70&10&5%  
New Haven Ratchet.....60&5@60&10%  
Barber Ratchet.....60&5@60&10%  
Barber's.....60&5%  
Spotted.....60&5@60&10%  
P. S. & W. Co., Peck's Patent.....60%  
Rose & Johnson.....50%  
Barker's Imp. Polished.....75&10@80%  
Barker's Imp. Nickeled.....65&10@70%  
Ratchet, Polished.....50&10@60%  
Ratchet, Nickeled.....40&10@50%  
Buffalo Ball.....net, \$1.10@1.15

### Brackets—

Shelf, fancy  
Sargent's list.....70@70&10%  
Other makes at a wide range of prices.  
Shelf, plain  
Sargent's list.....65@70%  
Bradley Shelf Brackets.....70&10%

### Bright Wire Goods—See

### Wire.

### Broilers—

Hens' Self-Inch.....9 10 9 11  
Basting.....\$ per doz. \$4.50 5.50 6.50  
Morgan Odorless.....\$ doz \$12.50  
New Haven.....60%  
Queen City.....33%  
Wire Goods Co.....65&10%

### Buckets, Well—

### Galvanized—

Helwig's Flat Iron Band.....\$3.75  
Helwig's Wired Top.....\$ doz \$4.00  
Hill's.....\$ doz 12 qt. \$4.25; 14 qt. \$5.25  
Iron Clad.....\$ doz 14 qt. \$4.25@5.50

### Bull Rings—See Rings, Bull.

### Butcher's Cleavers—See

### Cleavers, Butchers.

### Butts—

### Brass—

Cast Brass, Fast.....33%&10%  
Cast Brass, Loose Joint.....33%&10%  
Cast Brass, Tiebolt.....50%  
Wrought Brass.....80&80&10%

## Cast Iron—

Fast Joint, Broad.....50&10@60%  
Fast Joint, Narrow.....50&10&5@60%  
Loose Joint, Japanned.....  
Loose Joint, Jap. with Acorns.....  
Loose Pin, Acorns.....75&5%  
Loose Pin, Acorns, Japanned.....75&10%  
Loose Pin, Acorns, Japanned,  
Plated Tips.....&5  
Mayer's Rings.....  
Parliament Butts.....

## Wrought Steel—

Fast Joint, Broad.....  
Fast Joint, Narrow.....  
Fast Joint, Lt. Narrow.....  
Inside Blind, Light.....  
Inside Blind, Regular.....  
Loose Joint, Broad.....  
Loose Pin.....  
Table Butts, Back Flaps, &c.....  
Bronzed Wrought Butts.....50&50&10%

## Cages, Bird—

Hendryx, Brass.....10@50%  
Hendryx, Enameled.....40&10@50%

## Callipers—See Compasses.

## Calks Too—

Burke's, One Prong, Blunt.....5%  
Burke's, One Prong, Sharp.....40%  
Burke's, Two Prong, Blunt.....7%  
Gautier, One Prong, Blunt.....5%  
Can Openers—See Openers.

## Cans, Milk—

S. S. & Co.: 5-gal., \$5.00; 3-gal., \$4.40;  
10-gal., \$4.75 each.....40&10

## Cans, Oil—

Galvanized Blue Band, 1 gal., \$ doz. \$2.35  
Galvanized Blue Band, 5 gal., Tip-Top,  
\$ doz. \$12.00  
Galvanized Blue Band, 5 gal., Faucet,  
\$ doz. \$8.00  
Glass Oil, Friend.....\$ doz. \$2.75

## Caps—

### Per percussion—

Hicks & Goldmark's and Union Metallic  
Cartridge Co.....\$ 1000  
Eley's E. B.....50&58%  
Eley's D Waterproof, Central Fire.....\$1.60  
E. B. Grnd. Edge, Cent. Fire, 1-10's.....  
E. B. Trimmed Edge, 1-10's.....47@50%  
F. L. Waterproof, 1-10's.....47@50%  
G. D.....27@30%  
Musket, Waterproof, 1-10's.....50@55%  
S. B. Genuine Imported.....45%

### Primers—

Berdan Primers, \$1.00.....2%  
B. L. Caps (Sturtevant Shells) \$1.00.....2%  
All other Primers, \$1.20.....2%

## Cards—

Watson's Cotton, Wool, Horse and  
File, list January 28, 1891.....25%

## Carpet Stretchers—

### See Stretchers, Carpet.

## Cartridges—

B. B. Caps, Con. Ball, Swgd., \$1.85@1.90  
B. B. Caps, Round Ball, \$1.00@1.65  
Blank Cartridges, except 22 and 32 cal.,  
additional 10% to above discounts.  
Blank Cartridges, 22 cal. \$1.75.....2%  
Blank Cartridges, 32 cal., \$3.50.....2%  
Cent. Fire, Military and Sporting.....15&5&2%

Cent. Fire, Pistol and Rifle.....25&5&2%

Primed Shells and Bullets.....15&5&2%

Rim Fire Cartridges.....15&5&2%

Rim Fire Military.....15&5&2%

## Carpet Sweepers—

### See Sweepers, Carpet.

## Casters—

Bed.....Brass.....55&55&10%  
Plate.....Others.....60&60&10%  
Shallow Socket.....40&10%  
Deep Socket.....35%  
Giant Truck Casters.....45%  
Gwinner's Common Sense.....45%  
Gwinner's Hercules.....45%  
Martin's Patent (Phoenix) 45&10@50&10%  
Payson's Anti-friction.....70@70&10%  
Payson's Truck.....80&60&10%  
Socket Truck Casters.....50&50&10%  
Stationary Truck Casters.....50&10%  
Tucker's Patent, low list.....45%  
Yale Casters, low list.....45%  
Yale, Gem.....70%

## Cattle Leaders—

### See Leaders, Cattle.



**Chalk Lines—See Lines.****Checks, Door—**

Unity.....50c

**Chisels—****Socket Framing and Firmer**

Ohio Tool Co.....75c10@75c10@10c

P. S. &amp; W.....30c

Wetherby.....30c

Buck Bros.....30c

Douglas.....75c10@75c10@10c

Merrill.....80c10@80c10@10c

L. &amp; J. White.....30c10@30c10@10c

**Tanged and Miscellaneous**

Buck Bros.....30c

Butchers'.....\$4.75@5.00 to 2

Spear &amp; Jackson's.....\$5 to 2

Tanged Firmers.....50c50c10c

Cold Chisels, fair quality, # 14@16c

**Chucks—**

Beach Pat.....each \$8.00.....20c

Danbury.....each \$6.00, 30c@25c

Graham Patent.....33c4c

Morse's Adjustable, each, \$7.00, 20c@25c

Syracuse, Ball Pat.....25c

Skinner's Patent Chucks.....33c4c

Combination Lathe Chucks.....15c

Independent Lathe Chucks.....40c

Universal Lathe Chucks.....40c

Union Mfg. Co.....40c

Combination.....40c

Independent.....40c

Universal.....40c

Victor.....\$3.50, 25c

**Churns—**

McDermald Star Barrel Churn, each

6 gal., \$2.60; 10 gal., \$2.75; 15 gal.,

\$3.00; 20 gal., \$3.25.

Turn Union, each, 5 gal. \$3.25; 7 gal.,

\$3.75; 10 gal., \$4.25.

**Clamps—**

Adjustable, Cincinnati.....15c10c

Adjustable, Cincinnati.....15c10c

Adjustable, Cincinnati.....15c10c

Barnes' Machinists' Clamps.....33c4c

Cabinet, Sargent's.....70c10c

Carpenter's, Cincinnati.....25c10c

Carriage Makers', P. S. &amp; W. Co., 40c10c

Eberhard Mfg. Co.....40c50c10c

R. I. Tool Co.'s Wrought Iron.....25c

Saw Clamps, see Vises, Saw Filers

Stearns' Adjustable Cabinet and Cor-

ner.....30c30c10c

Warner's.....40c10c40c10c5c

**Cleavers, Butchers'—**

Beatty's.....40c40c5c

Bradley's.....25c30c

Foster Bros.....30c

New Haven Edge Tool Co.'s.....40c

Nichols Bros.....30c

P. S. &amp; W.....33c4c5c10c

Schulte, Lohoff &amp; Co.....40c40c5c

L. &amp; J. White.....20c5c

**Clips—**

Baker Axle Clips.....25c

Norway, Axle, # 5-16.....55c5c5c

Norway Spring Bar Clips, # 16.....50c

2d grade Norway Axle, # 5-16.....55c5c

Steel Felloe Clips.....# 5, 5c

Superior Axle Clips.....55c5c5c

Wrought Iron Felloe Clips.....# 5, 5c

**Cloth and Netting, Wire**

—See Wire, &amp;c.

**Cockeyes—**

Cocks Brass—

Hardware list (Globe, Kerosene, Lever

Bibbs, Racking, &amp;c.).....80c20c10c

**Coffee Mills—See Mills, Coffee.****Collars, Dog—**

Brass, Pope &amp; Steven's list.....40c

Chapman Mfg. Company, new list.....40c

Embossed, Gilt, Pope &amp; Steven's list,

30c10c

Leather, Pope &amp; Steven's list.....40c

Medford Fanny Goods Co.....40c10c50c

**Combs Curry**

American Curry Comb Co.....33c40c

Fitch's.....50c10c50c10c10c

Gibb's Magnetic.....# doz., \$2.00

Kohler's Humane.....# doz., \$1.75

Kohler's Magic Oscillating.....# doz., \$2.00

Rubber, per doz., \$10.00.....25c

**Compasses, Dividers &c.**

Compasses, Calipers, Dividers, 70c10c75c

Bemis &amp; Call Co.'s

Dividers.....65c

Calipers, Call's Patent Inside.....65c

Calipers, Double.....65c

Calipers, Inside or Outside.....65c

Calipers, Wing.....60c

Compasses.....50c25c

Excelsior.....50c

Starrett's

Combination Dividers.....25c

Lock Calipers and Dividers.....25c

Spring Calipers and Dividers.....25c10c

Stevens &amp; Co.'s.....25c10c

**Coolers, Water—**

B. &amp; C. Co., 2-gal., \$2.00; 3-gal., \$2.50;

4-gal., \$2.75; 5-gal., 40 each.....33c4c

**Coopers' Tools—**

—See Tools, Coopers'.

**Cord—Sash—**

Braided, Crown Drab and Fancy, #

10, 55c.....30c

Braided, Crown White, # 10, 50c.....40c

Cable Laid Italian Sash.....# 19, 20c

Common.....# 18, 20c

Common Rust, India Hemp, Braided.....# 12, 15c

India Cable Laid Sash.....# 11, 12c

Massachusetts, White.....25c

Ossawa Mills—

Braided, Giant, Drab and Fancy, #

10, 35c.....10c

Braided, Giant, White, # 30, 30c.....20c

Patent, good quality.....10c11c

Patent Russia Sash.....# 13, 14c

Samson—

Braided, Drab Cotton.....# 42, 42c

Braided, Italian Hemp.....# 40, 40c

Braided, Linen.....# 66, 66c

Braided, White Cotton.....# 27, 27c

Semper Idem, Braided, White.....# 26, 26c

Silver Lake—

A quality, Drab, 55c.....25c

A quality, White, 50c.....25c

B quality, Drab, 35c.....10c

B quality, White, 30c.....10c

Sylvan Spring, Extra Braided, Drab.....39c

Sylvan Spring, Extra Braided, White.....39c

Tate's Solid Braided—

Economy, Drab.....# 27, 27c

Economy, White.....# 22, 22c

Hercules, Drab.....# 80, 80c

Hercules, White.....# 25, 25c

White Cotton Braided, fair.....# 23, 24c

**Wire Picture—**

Braided or Twisted.....80c5c@80c15c

**Corkscrews—See Screws, Cork.****Corn Knives and Cutters**

—See Knives, Corn.

**Crackers, Nut—**

Acme.....

Japanned, # gro., \$30.....50c

Nickel Plated, # gro., \$30.....10c

Blake's Pattern, # doz., \$2.00.....10c

Table (H. &amp; B. Mfg. Co.).....40c

Turner &amp; Seymour Mfg. Co.....50c

**Cradles—**

Grain.....50c2@50c5c2c

**Crayons—**

White Crayons, # gross.....7@8c

D. M. Steward Mfg. Co.....25c

Metal Workers', # gross, \$2.50.....25c

Railroad, # gross, 2.50.....25c

Soapstone Pencils, # gross, 1.50.....25c

See also Chalk.

**Creamery Pails—See Pails, Creamery.****Crow Bars—See Bars, Crow.****Curry Combs—**

—See Combs, Curry.

**Curtain Pins—**

—See Pins, Curtain.

**Cutters—****Meat—**

American.....1 2 3 4 B 5 30c

Nos.....1 2 3 4 B 5 30c

Each.....\$5 \$7 \$10 \$25 \$50 \$80

Enterprise.....12 22 32 42

Each.....\$3 \$2.50 \$4 \$6 \$15

Dixon's, # doz.....\$14.00 \$17.00 \$19.00 \$30.00

Nos.....1 2 3 4 5 30c

Draw Cut, each:

Nos.....5 6 8

Hale's, # doz.....\$50 \$75 \$80 \$225.....20c25c

Nos.....11 12 13

Home No. 1, # doz.....\$27.00 \$33.00 \$45.00

Little Giant, # doz.....\$55c10c

Nos.....305 310 315 320 322

Miles Challenge, # doz.....\$35.00 \$48.00 \$72.00 \$88.00

Nos.....1 2 3 4 5 30c

Triumph No. 505, # doz.....\$22.00 \$30.00 \$40.00

Woodruff's, # doz.....\$21.00, 25c30c

Nos.....100 150

Chadborn's Smoked Beef Cutter, # doz.,

\$15.00 \$18.00

Enterprise Beef Shavers.....20c

**Saw and Kraut—**

Tucker &amp; Dorsey Mfg. Co.: 40c

Kraut Cutters, 1 Knife, # gross.....\$21.00

Saw Cutters, 2 Knife, # gross.....30.00

**Tobacco**

Acme.....# doz., \$20.00, 40c

All Iron.....# doz., \$4.25

Champion.....20c10c30c

Nashua Lock Co.'s.....# doz., \$18.00, 50c60c

National.....# doz., \$21.00, 30c

Sargent's.....# doz., \$24.00, 50c10c

Wilson's.....# doz., \$16.00, 60c10c

**Washer—**

Appleton's.....# doz., \$16.00, 60c10c

Bonney's.....30c10c

Cincinnati.....25c10c

Johnson's.....# doz., \$11.00, 30c4c

Pol. #14, Jap'd, \$16.50c

Smith's Pat.....# doz., \$12.00, 20c10c10c

**Diggers, Post Hole, &c.—**

Cronk's Post Bars, # doz., \$80.00,

50c50c50c10c

Eureka Diggers.....# doz., \$12.00@33c

Fletcher Post Hole Augers, # doz., \$38.00,

20c20c10c

Gem Improved # doz., \$9.00@10c10c

Gibb's Columbia.....# doz., \$12.00

Gibb's Hustler.....# doz., \$10.00

Gibb's Imperial.....# doz., \$7.50

Gibb's National.....# doz., \$12.00

Gibb's Post Hole Digger.....# doz., \$12.75

Kohler's Hercules.....# doz., \$14.00

Kohler's Invaluable.....# doz., \$12.00

Kohler's Little Giant.....# doz., \$18.00

Kohler's New Champion.....# doz., \$8.00

Samson, # doz., \$34.00.....25c25c10c

Schneider.....# doz., \$18.00

Shimer's Hollow Handle.....# doz., \$24.00,

50c

Vaughan's Post Hole Auger, # doz.,

\$8.00@9.50

**Dividers—See Compasses.****Dog Collars—See Collars, Dog.****Door Checks—**

—See Checks, Door.

**Door Springs—**

—See Springs, Door.

**Drawers.**

Money, # doz.....\$18@20

Wadell's Improved, No. 1, # doz., \$15.00

Wadell's Improved, No. 2, # doz., \$18.00

Wadell's Desk and Drawer, each \$7.50

Wadell's Desk and Show case, each \$7.50

**Drawing Knives—**

—See Knives, Drawing.

**Drills and Drill Stocks—**

Blacksmiths'.....each \$1.75

Automatic Self-Feeding, each \$7.50, 20c

Automatic Boring Tools.....\$1.75@1.85

Breast, Bartholomew's.....each \$2.50

Breast, Millers Falls.....each \$3.00, 25c

Breast, P. S. &amp; W.....each \$4.00, 10c

Breast, Wilson's.....30c25c

Chicopee Automatic Drill.....20c10c

Goodell Automatic Drills.....40c25c

Ratchet, Curtis &amp; Curtis.....25c

Ratchet, Ingersoll's.....20c20c25c

Ratchet, Merrill's.....20c20c25c

Ratchet, Moore's Triple Action.....25c30c

Ratchet, Parker's.....20c20c25c

Ratchet, Weston's.....20c25c

Ratchet, Whitney's.....20c10c

Whitney's Hand Drill, Plain, \$11.00

Adjustable.....\$12.00.....20c10c

**Twist Drills—**

Cleveland.....50c10c10c

Diamond, W. &amp; B.....50c10c10c

Graham's Pat. Groove Shank.....50c10c10c

Moran.....50c10c10c

New Process.....50c10c10c

Standard.....50c10c10c

Syracuse (Metal list).....50c10c

**Drill Bits or Bit Stock**

Drills—See Augers and Bits.

Drill Chucks—See Chucks.

**Dripping Pans—**

—See Pans, Dripping.





Plate.....33%&2%  
 Romer's Night Latches.....15%  
 R. & E. Mfg. Co., list Mar. 20, 1893.....60%&10%  
 Sargent & Co. Lds. Atz. 1.75. 60%&10%  
 Warner's Burglar Proof. 60%&10%  
 Yale.....net prices

### Elevator—

Moore's.....33%&2%

### Padlocks—

Wrought Iron Padlocks:  
 Brittan, Graham & Mathes, list June 10, 1891.....30%&2%  
 Mallory, Wheeler Co., list January 1, 1894.....75%  
 Norwich Lock Mfg. Co., list June 10, 1891.....50%&2%  
 Russell & Erwin Mfg. Co., list June 10, 1891.....50%&2%  
 Sargent & Co., list January 1, 1894.....75%  
 William Wilcox Mfg. Co., list January 1, 1891.....75%&20%  
 Ames Sword Co. up to No. 150.....40%  
 Barnes Mfg. Co.....40%&10%  
 Champion Padlocks.....40%  
 A. E. Deitz.....40%  
 Eureka, Eagle Lock Co.....40%&2%  
 E. T. Fraim's Keystone Scandinavian.....90%&40%  
 1010 line.....90%&25%  
 120 line.....90%&25%  
 225, 310 and 210 lines.....70%  
 510 line.....70%&10%  
 109 line.....70%&10%  
 All other numbers.....50%&5%  
 Horseshoe.....50%  
 Hotchkiss.....30%  
 Nock's.....30%  
 Romer's Nos. 0 to 9.....30%  
 Romer's Scandinavian & Nos. 100 to 505.....15%  
 Scandinavian.....90%&50%  
 Slaymaker, Barry & Co.....90%&50%  
 No. 1010 line.....90%&50%  
 No. 41 line.....60%  
 No. 61 line.....60%  
 No. 21 line.....80%  
 Star.....60%  
 Yale Lock Mfg. Co.'s.....net prices

### Sash, &c.—

Attwell Mfg. Co.....25%&33%  
 Champion Safety list January 1893.....70%  
 Clark's No. 1, 510; No. 2, 33 gr.....33%  
 Common Sense, Jap'd, Cop'd and Br'ed.....gr \$4.00  
 Common Sense, Nickel Plated.....gr \$10.00  
 Corbin's Daisy, list Feb. 15, 1893.....70%  
 Davis Bronze, Barnes Mfg. Co.....60%  
 Ferguson's.....33%  
 Fish (Liesche's pat.), No. 100, gr, 88.....50%  
 No. 105, gr, 10.....70%  
 Giant, list Jan. 1893.....70%  
 Hammond's Window Springs.....40%  
 Hingulin's New Sash Locks.....25%&2%  
 Hingulin's Sash Balances.....25%&2%  
 Ives' Patent.....60%&10%  
 Kempshall's Gravity.....60%  
 Kempshall's Model.....60%&10%  
 March.....60%&10%  
 Payson's Perfect.....60%&10%  
 Reading.....60%&10%  
 Security.....70%  
 Universal.....30%  
 Victor.....60%&10%  
 Walker's.....10%  
 Wolcott's.....60%&10%

### Lumber Tools—

See Tools, Lumber.

### Lustro—

Four-ounce bottles.....\$ doz, \$1.75; 7 gross \$17.00

### Machines.

#### Boring—

Without Augers. Upright, Angular.  
 Boss, Carpenters' 3.60  
 Boss, Ship Bldrs. 3.85  
 Douglas.....\$5.50 each.....50%  
 Jennings' 5.50 6.75.....50%&10%  
 Miller's Falls.....7.50.....25%  
 Phillips' Patent with Auger.....7.00 7.50.....40%&10%  
 Snell's, Rice's Pat 5.50 6.75.....40%&10%

#### Fluting—

American, 5 in., \$3.00; 6 in., \$3.40; 7 in., \$4.50 each.....35%  
 Combined Fluter and Sad Iron.....\$ doz \$15.00.....30%  
 Crown, 4 1/2 in., \$3.50; 6 in., \$4.00; 8 in., \$5.50 each.....35%  
 Crown Hand Fluter, No. 1, \$15.00; 2, \$12.50; 3, \$10.00; 4, \$8.25.....35%  
 Crown Jewel, 6 in.....\$3.50 each, 35%  
 Domestic Fluter.....each, \$1.50  
 Eagle, 6 1/2 inch Rolls, \$2.15.....35%  
 Eagle, 6 1/2 inch Rolls, \$2.85.....35%  
 Geneva Hand Fluter, White Metal.....\$ doz \$12, 25%  
 Knox, 4 1/2 inch Rolls.....\$3.25 each.....35%  
 Knox, 6 inch Rolls.....\$3.60 each.....35%  
 Shepard Hand Fluter, No. 85, per doz \$15.50.....40%  
 Shepard Hand Fluter No. 95, \$ doz \$35.00.....40%  
 Shepard Hand Fluter, No. 110, \$ doz \$11.00.....40%

#### Holting—

Moore's Anti-Friction Differential Pulley Block.....20%  
 Moore's Hand Hoist, with Lock Brake.....20%  
 Moore's Rope Differential Pulley Block.....60%  
 Maris & Beekley (Teal Patent).....30%  
 See also Blocks.

#### Washing—

Fair and Square.....\$ doz \$42.00  
 Anthony Wayne, \$ doz, No. 1, \$42; No. 2, \$36; No. 3, \$42.  
 Wayne American.....\$ doz \$36.00  
 Welsh.....\$ doz \$54.00  
 Western Star \$ doz, No. 2, \$36; No. 3 \$39

### Mallets—

B. & L. Block Co., Hickory & L. V. 30%&10%  
 Fibre Head, Stearns.....33%  
 Hickory.....20%&10%  
 Lignum vitae.....20%&10%  
 Mattocks—Regular list.....60%&10%

### Measures—

Standard Fibreware, No. 1, peck 6 dozen, \$3.50; 1/2 peck, \$3.90

### Meat Cutters—

See Cutters, Meat.

### Menders, Harness—

Per doz.....\$2.50

### Milk Cans—See Cans, Milk.

### Mills—

Box and Side, list Jan. 1, 1888.....60%&5%  
 Net prices are often made which are lower than above discount.  
 American, Enterprise Mfg. Co., list Jan. 17, 1893.....20%  
 National List, Jan. 1, 1894.....30%  
 Swift, Lane Bros.....30%  
 Vaddell's New Box Mills, Ideal Brand, New List.....60%

### Mincing Knives—

See Knives, Mincing.

### Molasses Gates—

See Gates, Molasses.

### Money Drawers—

See Drawers, Money.

### Mowers, Lawn—

Out of Season.

### Muzzles—

Safety.....\$ doz, \$3.00, 25%

### Nails—

Cut and Wire. See Trade Report.  
 Wire Nails, Papered.  
 Association list, May 1, '92.....85%&5%  
 Tack Mfrs' list.....70%&5%  
 Hungarian, Finishing, Upholsterers', &c. See Tacks.

### Horse—

|                     | Nos. 6 | 7   | 8   | 9   | 10  |
|---------------------|--------|-----|-----|-----|-----|
| A. C.....           | 20%    | 23% | 22% | 21% | 21% |
| Anchor.....         | 9%     | 9%  | 9%  | 9%  | 9%  |
| Ausable.....        | 28%    | 26% | 25% | 24% | 23% |
| Capewell.....       | 19%    | 18% | 17% | 16% | 15% |
| C. B. K.....        | 26%    | 23% | 22% | 21% | 21% |
| Champion.....       | 25%    | 23% | 22% | 21% | 20% |
| Champlain.....      | 28%    | 26% | 25% | 24% | 23% |
| Clinton, Fin.....   | 19%    | 17% | 16% | 15% | 14% |
| Empire Bronzed..... | 28%    | 26% | 25% | 24% | 23% |
| Essex.....          | 28%    | 26% | 25% | 24% | 23% |
| Lyra.....           | 9%     | 9%  | 9%  | 9%  | 9%  |
| Maud S.....         | 26%    | 23% | 22% | 21% | 21% |
| Northwest'n.....    | 25%    | 23% | 22% | 21% | 20% |
| Putnam.....         | 23%    | 21% | 20% | 19% | 18% |
| Snowden.....        | 9%     | 9%  | 9%  | 9%  | 9%  |
| Standard.....       | 23%    | 21% | 20% | 19% | 18% |
| Vulcan.....         | 23%    | 21% | 20% | 19% | 18% |
| Western.....        | 23%    | 21% | 20% | 19% | 18% |

### Picture—

Brass Head, Combination list.....50%&10%  
 Brass Head, Sargent's list.....60%&10%  
 Porcelain Head, Combination list.....40%&10%  
 Porcelain Head, Sargent's list.....50%&10%  
 Niles' Patent.....40%

### Nail Pullers—See Pullers, Nail.

### Nail Sets—See Sets, Nail.

### Nut Crackers—

See Crackers, Nut.

### Nuts—List Dec. 18, 1893.

Square, Hex  
 Cold Punched.....5.00 6.10 off list  
 In packages of 100 lb, add 1-10% lb, net;  
 in packages less than 100 lb, add 1/2% lb, net.  
 Hot Pressed.....5.80 6.50 off list

### Oakum—

Best or Government.....\$ doz 6%  
 Navy.....\$ doz 5%  
 U. S. Navy.....\$ doz 5%  
 Oil Tanks—See Tanks, Oil.

### Oilers—

Brown Copper.....50%&10%  
 Zinc and Tin.....50%&10%  
 Broughton's rasc.....50%  
 Broughton's Zinc.....50%  
 Malleable, Hammers' Improved, No. 1, \$3.80; No. 2, \$4.00; No. 3, \$4.40 \$ doz.....10%&10%  
 Malleable, Hammers' Old Pattern, same list.....45%  
 Olmstead's Brass and Copper.....50%  
 Olmstead's Tin and Zinc.....60%  
 Prior's Pat. or "Paragon" Brass.....50%  
 Prior's Pat. or "Paragon" Zinc.....50%  
 Steel, Draper & Williams.....60%&10%  
 Wilnot & Hobbs Mfg. Co., Steel Anti-Rust.....60%

### Openers, Can—

American.....\$ gross \$1.75 to \$2.00  
 Champion, \$ doz \$2.00.....50%  
 Domestic, \$ doz \$2.00.....45%  
 Eureka.....\$ doz \$2.50, 15% 20%  
 Excelsior, No. 1 \$2.50; No. 2, \$1.50.....40%  
 French, No. 4.....\$ doz \$2.25, 55% 60%  
 Iron Handle, No. 5.....\$ gr \$6.00, 45% 60%  
 Lyman's.....\$ doz \$3.75, 20%  
 Messenger's Comet.....\$ doz \$3.00, 25%  
 Moore's.....\$ doz \$2.75 to \$3.00  
 Sardinia Scissors.....\$ doz \$2.75 to \$3.00  
 Sprague, No. 1, 55¢; 2, 60¢; 3, 65¢; Star.....\$ doz \$2.75  
 Universal, \$ doz \$3.00.....55%  
 World's Best \$ gross, No. 1, \$12.00; No. 2, \$24.00; No. 3, \$36.00.....50%&10%

### Packing, Steam—

### Rubber—

Standard, fair quality.....70%&10%  
 Inferior quality.....75%  
 Extra.....80%  
 Jenkins' Standard, \$ doz \$8.00.....60%  
 N. Y. B. & P. Co., Empire.....60%  
 N. Y. B. & P. Co., Salamander.....25%  
 N. Y. B. & P. Co., Standard.....50%  
 Miscellaneous—  
 American Packing.....10%  
 Cotton Packing.....15%  
 Italian Packing.....15%  
 Russia Packing.....15%

### Pails—

S. S. & Co.: 18-qt., \$7.00; 20-qt., \$7.25 \$ doz.....5%

### Galvanized—

Quarts 10 12 14  
 Central Stamping Co.....2.50 2.75 3.00  
 Fire Buckets.....2.75 3.25 3.50  
 Hill's Heavy Weight, \$ doz, 3.00 3.25 3.50  
 Hill's Light Weight, \$ doz, 2.75 3.00 3.25  
 Iron Clad.....2.50 2.75 3.00  
 Sidney Shepard & Co.....2.50 2.75 3.00  
 Buckets—See Well Buckets.

### Indurated Fiber Ware

Fire Pails, deep.....\$ doz \$4.80  
 Fire Pails, round bottom.....\$ doz \$5.40  
 Milk, 14 qt.....\$ doz \$5.40  
 Stable, 14 qt.....\$ doz \$5.00  
 Star Pails, 12 qt.....\$ doz \$4.20

### Standard Fiber Ware—

Buggy Pails.....\$3.00  
 Chamber Pails, 14 qt.....4.00 \$7.00  
 Fire Pails, 14 qt, \$ doz, 3.75 4.25  
 Fire Pails, No. 2, 14 qt, \$ doz, 3.25 3.75  
 Horse Pails.....4.00  
 Slop Jars (bal. trap).....7.50 8.50  
 Sugar Pails.....5.00 5.50  
 Water Pails, 12 qt, \$ doz, 3.15 3.75

### Pans—

Large sizes.....\$ doz 5%  
 Small sizes.....\$ doz 5%  
 Silver & Co. (Covered).....40%

### Fry—

Standard List:  
 No. 1.....\$ doz \$3.00 \$3.75 \$4.25 \$4.75 \$5.25  
 No. 2.....5 6 7 8  
 No. 3.....\$ doz \$6.00 \$7.00 \$8.00 \$9.00  
 Polished, regular goods.....75%&10%  
 Acme Fry Pans.....60%&5%

### Dust—

Steel Edge, No. 1.....\$ doz \$1.75

### Roasting and Baking—

Columbian, S. S. & Co.: Nos. 10, \$2; 20, \$2.50; 30, \$2.50 each.....60%&10%

### Paper and Cloth—

Sand and Emery—  
 List April 19, 1888.....50%&10%  
 Sibley's Emery and Crocus Cloth.....30%

### Parers—

Apple—  
 Advance.....\$ doz \$4.75  
 Baldwin.....\$ doz 5.25  
 Bonanza.....each 5.00  
 Dandy.....each 4.00  
 Eclipse.....\$ doz 4.00  
 March.....each 16.00  
 Family Bay State.....\$ doz 5.00  
 Favorite.....\$ doz 5.00  
 Gold Medal.....\$ doz 4.00  
 Ideal.....\$ doz 4.00  
 Improved Bay State.....\$ doz 27.00 to \$80.00  
 Little Star.....\$ doz 4.50  
 Monarch.....\$ doz 13.50  
 New Lightning.....\$ doz 5.00  
 Oriole.....\$ doz 4.00  
 Penn.....\$ doz 3.00  
 Perfection.....\$ doz 4.00  
 Pomona.....\$ doz 4.25  
 Reading 78.....\$ doz 7.00  
 Rocking Table.....\$ doz 6.00  
 Turn Table.....\$ doz 4.50  
 Victor.....\$ doz 13.50  
 Waverly.....\$ doz 4.00  
 White Mountain.....\$ doz 4.00

### Potato—

Antrim Combination.....\$ doz \$5.50  
 Hoosier.....\$ doz \$13.50  
 J. B. & Co.....\$ doz \$5.50  
 White Mountain.....\$ doz \$5.50

### Pencils, Soapstone—

See Crayons.

### Pickers, Fruit—

Prize Fruit Pickers.....50%

### Picks—

Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00.....60%&10%  
 Railroad or Adze Eye, 8 to 10, \$18.00; 10 to 12, \$20.00.....60%&10%

### Picture Nails—

See Nails, Picture.

### Pinking Irons—

See Irons, Pinking.

### Pins—

Bow—  
 Humason, Beckley & Co.'s.....60%&10%  
 Peck, Stow & W. Co.'s.....60%&10%  
 Sargent & Co.'s, \$17 and \$18.....60%&10%

### Escutcheon—

Brass.....60%&10%  
 Iron, list Nov. 11, 1888.....60%&10%

### Pipe, Wrought Iron—

List April 13, 1893.  
 1 1/2 and under, Plain.....57%&10%  
 1 1/2 and under, Galv.....50%&10%  
 1 1/2 and over, Plain.....67%&10%  
 1 1/2 and over, Galv.....57%&10%  
 Boiler Tubes, list Oct. 24, 1892.....60%&10%  
 Casing, list Nov. 18, 1892.....52%&10%  
 Cold Drawn Seamless Steel Tubing.....50%  
 Inserted Joints Casing, list Nov. 18, 1892.....47%&5%  
 Steel Boiler Tubes.....27%&5%

### Planes and Plane Irons—

### Wood Planes—

Molding.....40%&10%  
 Bench, First quality.....45%&10%  
 Bench, Second quality.....50%&10%  
 Bailey's (Stanley R. & L. Co.).....60%&10%

### Iron Planes—

Bailey's (Stanley R. & L. Co.).....50%&10%  
 Birmingham Plane Co.....60%&10%  
 Chapin's Iron Planes.....50%&10%  
 Davis Iron Planes.....50%&10%  
 Gage Tool Co.'s Self-Setting.....20%&10%  
 Meriden Mal. Iron Co.'s.....50%&10%  
 Miscellaneous Planes (Stanley R. & L. Co.).....25%&10%  
 Sargent's.....60%&10%  
 Standard Tool Co.....50%&10%  
 Stearns' Iron Planes.....50%&10%

### Plane Irons—

Auburn Thine.....30%&10%  
 Buck Bros.....\$5.00 to \$6.25 to 10

Ohio.....30%&10%  
 Sandusky.....30%&10%  
 Stanley R. & L. Co.....50%&10%  
 L. & J. J. White.....25%

### Plates—

Felice.....\$ doz 6%&10%

### Pilers and Nippers—

Button's Patent.....60%  
 Carew's Pat. Wire Cutters.....20%  
 Cronk's 8 in., \$15.00; 10 in.....\$20  
 Cronk's Patent Pattern.....50%&10%  
 Cronk's Carrier Pliers.....60%&10%  
 Eureka Pliers and Nippers.....40%  
 Gas Pliers.....60%  
 Gas Pliers, Custer's Nickel Plated.....60%  
 Hall's No. 2, 6 in., \$13.50; No. 4, 7 in., \$21.00 \$ doz.....40%  
 Humason & Beckley Mfg. Co. 50%&10%  
 Lindsay's Giant.....35%  
 Morrill's Parallel, \$ doz, \$12.00.....30%  
 P. S. & W. Cast Steel.....50%&10%  
 P. S. & W. Tinner's Cutting Nippers, add 6%.....10%  
 Russell's Parallel.....25%

### Plumbs and Levels—

Regular List.....75%&10%  
 Cook's.....40%&10%  
 Davis Incl.ometers.....10%&10%  
 Davis Iron Levels.....30%  
 Disston's.....50%  
 Pocket Levels.....70%&10%  
 Stanley's Duplex.....20%&10%  
 Stanley's Handy.....20%&10%

### Poachers, Egg—

Buffalo Steam Egg Poachers, \$ doz.....33%  
 No. 1, \$8.00; No. 2, \$9.00.....33%  
 Silver & Co., 6-Ring, \$ doz, \$4.00; 3-Ring.....2.00

### Pokes, Animal—

Bishop's American.....\$ doz \$2.65  
 Bishop's I. X. L.....\$ doz \$5.75  
 Bishop's Steel Monarch.....\$ doz \$4.50  
 Bishop's Pioneer.....\$ doz \$3.50  
 Bolding.....\$ doz \$6.00  
 Buckeye, Single Stale.....\$ doz \$2.75  
 Eagle, Double Stale.....\$ doz \$5.75  
 Eagle, Single Stale.....\$ doz \$3.75  
 Metallic Horse Poke.....\$ doz \$6.00

### Police Goods—

Daley's Improved Handcuffs, 2 Hands, Polished, \$ doz, \$48.00; Nickel, \$57.00; 3 Hands, Polished, \$ doz \$72.00; Nickel, \$84.00.....25%  
 J. P. Lovell's Police Goods.....25%  
 Newhall Ship Chandlery Co., Handcuffs, \$15.00 \$ doz.....25%  
 Towers's.....25%

### Polish—

Gaston's Silver Compound.....33%  
 Prestoline Paste.....33%&

**# Pullers Nail—**

Eclipse..... doz., \$24.00, 40¢  
 Economy..... doz., \$24.00, 40¢  
 Giant, No. 1..... doz., \$18.00, 10¢  
 Giant, No. 2..... doz., \$18.00, 10¢  
 Pelican..... doz., \$24.00, 25¢  
 Scranton..... doz., \$18.00, 35¢

**Pulleys—**

Brass Sorew..... 70¢  
 Hay Fork, "Anti-Friction," 5 in. solid, \$5.70..... 50¢  
 Hay Fork, "F" Common and Patent Bushed..... 20¢  
 Hay Fork, Moore's Anti-Friction 5 in. Wheel, doz., \$12.00..... 40¢  
 Hay Fork, Reed's Self-Lubricating..... 60¢  
 Hay Fork, Solid Eye, \$4.00; Swivel, \$4.50..... 50¢  
 Hay Fork, Stearns' Nos. 35 & 45..... 50¢  
 Hay Fork, Stearns' Nos. 15, 25, 50, 60, 80..... 20¢  
 Hay Fork, Tarroux Pat. Iron..... 60¢  
 Hot House Awning, &c..... 60¢  
 Japanned Sorew..... 60¢  
 Japanned Sorew..... 60¢  
 Moore's Ceiling or End, Anti-Friction..... 40¢  
 Moore's Dumb Waiter, Anti-Friction..... 50¢  
 Moore's Electric Light..... 35¢  
 Moore's Side, Anti-Friction..... 50¢  
 Sash (Auger Handle)..... 60¢  
 Common Sense..... 60¢  
 Empire..... 60¢  
 Ideal, Nos. 2, 4, 10 & 16..... 60¢ less 1¢  
 Ideal, Nos. 25 & 45..... doz. net.  
 On bbl. lots extra 5%  
 Shade Rack..... 45¢  
 Shepard's Niagara, No. 25, doz 23¢ net  
 Tackle Blocks—See Blocks.

**Pumps—**

Clister, Best Makers..... 60¢  
 Pitcher Spout, Best Makers..... 60¢  
 Pitcher Spout, Cheaper G'ds..... 75¢  
 Myers' Pumps, low list..... 50¢

**Punches—**

Avery's Revolving..... 40¢  
 Avery's Sawset and Punch—See Sawsets  
 Bemis & Call Co.'s Cast Steel Drive..... 50¢  
 Bemis & Call Co.'s Check..... 55¢  
 Bemis & Call Co.'s Spring..... 50¢  
 Bemis & Call Co.'s Springfield Socket..... 65¢  
 Niagara Hollow Punches..... 20¢  
 Niagara Solid Punches..... 15¢  
 Rice Hand Punches..... 15¢  
 Saddle's or Drive, good..... doz., 60¢  
 Spring, good quality..... doz., \$2.50  
 Spring, Leach's Pat..... 15¢  
 Solid Tinner's, P. S. & W. Co., doz..... \$1.44  
 Tinner's Hollow Punches, P. S. & W. Co..... 20¢

**Rail—**

Barn Door, Light, In. 1/2, 3/4, 1, 1 1/2, 2, 2 1/2, 3, 3 1/2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

**Rakes—**

Cast Steel, Association G'ds..... 70¢  
 Cast Steel, outside G'ds..... 70¢  
 Malleable..... 70¢  
 Fort Madison Prize Bow Brace and Feeler..... 65¢  
 Fort Madison Steel Tooth Lawn Rake..... 65¢  
 The Gibbs'..... doz., \$4.00  
 Gibbs' Acme Lawn Rake..... doz., \$4.75  
 Gibbs' Canton Lawn Rake..... doz., \$3.75  
 Gibbs' Crown Lawn Rake, No. 1..... doz., \$4.00  
 Gibbs' Favorite Lawn Rake..... doz., \$3.80  
 Gibbs' Hustler No. 0..... doz., \$4.25  
 Gibbs' Hustler No. 1..... doz., \$4.40  
 Oneida Lawn Rake..... doz., \$3.00

**Razors—**

Campbell Cutlery Co..... 50¢  
 Electric Cutlery Co..... Net prices  
 Galvanic..... \$15.00  
 Jordan's AAAI, new list..... Net prices  
 Jordan's Old Faithful, new list..... Net prices  
 J. R. Torrey Razor Co..... Net prices  
 Wostenholme and Butcher, \$10 to 2..... 10¢

**Razor Strops—**

See Strops, Razor.

**Registers—**

Moore's Bronze Finishes..... 70¢  
 Moore's Electroplated..... 75¢  
 Moore's Japanned..... 75¢  
 Moore's Solid Bronze..... 65¢  
 Moore's Stove Pipe..... 35¢

**Rings and Ringers—**

**Bull Rings—**  
 Ellrich Hdw. Co., White Metal, low list..... 50¢  
 Hotchkiss' low list..... 30¢  
 Humason, Beckley & Co.'s..... 70¢  
 Peck, Stow & W. Co.'s..... 50¢  
 Sargent's..... 75¢  
 Union Nut Co..... 65¢  
**Hog Rings and Ringers—**  
 Blair's Hog Ringers..... doz \$2.00  
 Blair's Hog Ringers..... doz \$0.40  
 Brown's Ringers..... doz \$2.00  
 Brown's Ringers..... doz \$1.15  
 Champion Ringers..... doz \$2.00  
 Champion Ringers, Double..... doz \$2.25  
 Electric Hog Ringers..... doz \$2.00  
 Electric Hog Ringers..... doz \$2.25  
 Hill's Improved Ringers..... doz \$1.25  
 Hill's Old Style Ringers..... doz \$1.12  
 Hill's Ringers..... doz \$1.00  
 Hill's Tongs..... doz \$3.00  
 Major Ringers..... doz \$2.00  
 Major Ringers..... doz \$1.25  
 Perfect Ringers..... doz \$2.15  
 Perfect Ringers..... doz \$1.50  
 Top of the Hill Ringers..... doz \$2.00  
 Top of the Hill Ringers..... doz \$1.25  
**Rivets and Burrs—**  
 Copper..... 60¢  
 Coppered Iron, Betina Brand..... 50¢  
 Iron, Norway, list Nov. 17, '87..... 60¢  
 Second quality..... 70¢

**Rivet Sets—See Sets.****Roasting and Baking Pans—See Pans, Roasting and Baking.****Rods—**

Stair, Black Walnut..... doz 40¢  
 Stair, Brass..... 25¢

**Rollers—**

Acme Moore's Anti-Friction..... 55¢  
 Barn Door, Sargent's List..... 60¢  
 Moore's Barn Door Roller..... 50¢  
 Union Barn Door Roller..... 70¢  
 Thompson Mfg. Co.'s Lawn rollers..... 30¢

**Rope—The following prices are f. o. b.**

New York or factory, and are shaded 1/4¢ on large lots; terms, 1 1/2% for cash.  
 Manila, 7-16 in. diam. and larger..... 75¢  
 Manila, 3/4 in. diam. and larger..... 85¢  
 Manila, 1/2 and 5-16 in. diam. and larger..... 85¢  
 Manila, Tarred Rope..... 75¢  
 Sisal, 7-16 in. and larger..... 55¢  
 Sisal, 3/4 in. diam. and larger..... 75¢  
 Sisal, 1/2 and 5-16 in. diam. and larger..... 65¢  
 Sisal, Hay Rope..... 55¢  
 Sisal, Tarred Rope..... 55¢  
 Sisal, Medium Lath Yarn..... 55¢  
 New Zealand, 7-16 in. and larger..... 55¢  
 New Zealand, 3/4 inch..... 55¢  
 New Zealand, 1/2 and 5-16 in. diam. and larger..... 65¢  
 New Zealand, Hay Rope..... 55¢  
 New Zealand, Tarred Rope..... 55¢  
 Cotton Rope..... 15¢  
 Jute Rope..... 65¢

**Wire—**

List February, 1892. All kinds..... 45¢

**Rules—**

Boxwood..... 30¢  
 Ivory..... 50¢  
 Starrett's Steel Rules and Straight Edges..... 25¢

**Sad Irons—See Irons, Sad.****Sand and Emery Paper and Cloth—**

See Paper and Cloth.

**Sash Cord—See Cord, Sash.****Sash Locks—See Locks, Sash.****Sash Weights—**

See Weights, Sash.

**Sausage Stuffers or Fillers—See Stuffers or Fillers, Sausage.****Saws—**

Note.—Extra 5¢ to 10% often given.

Atkins' Circular..... 50¢  
 Atkins' Cross Cuts, new list..... 40¢  
 Atkins' Mulay, Mill and Drag..... 50¢  
 Atkins' One-Man Saw..... 40¢  
 Atkins' Wood Saws..... 40¢  
 Disston's Circular..... 45¢  
 Disston's Cross Cut, list Jan. 1, 1893..... 45¢  
 Disston's Hand..... 25¢  
 C. E. Jennings & Co.'s..... 25¢  
 Peace Circular and Mill..... 45¢  
 Peace Cross Cuts, list Jan. 1, 1893..... 45¢  
 Peace Hand, Panel and Rip..... 25¢  
 Richardson's Circular and Mill..... 45¢  
 Richardson's Cross Cuts, list Jan. 1, 1893..... 45¢  
 Richardson's Hand, &c..... 25¢  
 Simonds' Circular Saws..... 45¢  
 Simonds' Crescent Ground Cross Cut Saws..... 30¢  
 Simonds' Gang, Mill, Mulay and Drag Saws..... 45¢  
 Whetters, Adams & Clemons Mfg. Co. Cross Cuts, list Jan. 1, 1893..... 45¢  
 Hand, Panel and Rip..... 30¢  
 Woodrough & McFarlin Cross Cuts, list Jan. 1, 1893..... 45¢  
 Hand, Panel and Rip..... 25¢

**Hack Saws—**

Eureka and Crescent..... 25¢  
 Griffin's, complete..... 40¢  
 Griffin's Hack Saw Blades..... 40¢  
 Star Hack Saws and Blades..... 25¢

**Scroll—**

Barnes' Builders' and Cab Makers' \$15.25  
 Barnes' Scroll Saw Blades..... 35¢  
 Lester, complete, \$10.00..... 25¢  
 Rogers, complete, \$4.00..... 25¢

**Saw Frames—**

See Frames, Saw.

**Saw Sets—See Sets, Saw.****Saw Tools—See Tools, Saw.****Scales—**

Chatillon's Eureka..... 25¢  
 Chatillon's Favorite..... 40¢  
 Chatillon's Grocers' Trip Scales..... 50¢  
 Family, Turnbills..... 30¢  
 Hatch, Counter, No. 171, good quality..... 50¢  
 Hatch, Tea, No. 161..... 50¢  
 Riehle Bros' Platform..... 40¢  
 Union Platform, Plain..... 25¢  
 Union Platform, Striped..... 25¢

**Scale Beams—**

See Beams, Scale.

**Scissors, Fluting..... 45¢****Scrapers—**

Adjustable Box Scraper (S. R. & L. Co.)..... 40¢  
 Box, 1 Handle..... 25¢  
 Box, 2 Handle..... 30¢  
 Defence Box and Ship..... 20¢  
 Foot..... 60¢  
 Ship, Common..... 35¢  
 Ship, R. I. Tool Co..... 40¢

**Screen Window and Door****Frames—See Frames****Screw Drivers—**

See Drivers, Screw

**Screws—****Bench and Hand—**

Bench, Iron..... 55¢  
 Bench, Wood..... 25¢  
 Bench, Wood, Hickory..... 20¢  
 Hand, Wood..... 25¢  
 Hand, Grand Rapids, list..... 35¢

**Coach, Lag and Hand-Rail—**

Lag, Blunt Point, list Jan. 1, 1890..... 25¢  
 Coach and Lag, Gimlet Point, list Jan. 1, 1890..... 80¢  
 Hand Rail, Am. Screw Co..... 75¢  
 Hand Rail, H. & B. Mfg. Co..... 70¢  
 Hand Rail, Sargent's..... 70¢

**Jack Screws—**

Jack Screws, Millers Falls list..... 50¢  
 Jack Screws, P. S. & W..... 35¢  
 Jack Screws, Sargent..... 70¢  
 Jack Screws, Stearns..... 40¢

**Cork—**

Detroit Cork Screw Co..... 35¢  
 Humason & Beckley Mfg. Co. 40¢  
 Williamson's..... 35¢  
 Williamson's Forged Worm, Applewood Handle, doz., \$5.00; Rosewood, \$5.50..... 40¢

**Machine—**

Flat Head Iron..... 85¢  
 Round Head Iron..... 60¢

**Wood—**

List January 1, 1891.  
 Flat Head Iron..... 70¢  
 Round Head Iron..... 85¢  
 Flat Head Brass..... 70¢  
 Round Head Brass..... 70¢  
 Flat Head Bronze..... 70¢  
 Round Head, Bronze..... 65¢  
 Rogers' Drive Screws..... 85¢

**Scroll Saws—See Saws, Scroll.****Scythes—**

Grain..... 40¢  
 Grass..... 40¢

**Scythe Snaths—**

See Snaths, Scythe.

**Sets—**

Alken's Sets, Awns and Tools, No. 20, doz \$10.00..... 80¢  
 Common Brad Sets..... 60¢  
 No. 42, \$10.50; No. 43, \$12.50..... 70¢  
 Fray's A. J. Tool Hds., Nos. 1, 1 1/2, 2, 1 1/2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 10



**Snaps Harness, &c.**  
Anchor 1, & S. Mfg. Co. 65¢  
Fitch's (Bristol) 50¢10¢  
Hotchkiss 10¢  
Andrews 50¢  
Sargent's Patent Guarded 70¢10¢10¢  
German, New List 40¢10¢  
Covert 50¢10¢5¢2¢  
Covert, New Patent 50¢10¢5¢2¢  
Covert, New R. E. 50¢10¢5¢2¢  
Covered Spring 50¢10¢10¢10¢  
Covert's Saddlery Works' Triumph 35¢4¢  
John Pross Snaps 75¢75¢  
Kelley & Woolworth's Steel Harness 50¢10¢60¢

**Snaths**  
Seythe 50¢2¢50¢5¢2¢

**Soldering Irons**  
See Irons, Soldering.

**Spittoons, Cuspidors, &c.**  
Standard Fiberglass

Cuspidors, 8 1/2 inch, # doz., No. 5, \$8; No. 6, \$9.  
Spittoons, Daisy, 8-inch, No. 1, 4; 10 and 11 inch, \$3.

**Spoke Shaves**  
See Shaves, Spoke.

**Spoke Trimmers**  
See Trimmers, Spoke.

**Spoons and Forks**  
Tinned Iron

Basting, Cen. Stamp Co.'s list 70¢10¢  
Solid Table and Tea, Cen. Stamp Co.'s list 70¢10¢  
Buffalo, S. S. & Co. 35¢4¢2¢

**Silv**  
4 months or 5¢ cash 30 days:

Meriden Brit. Co. Rogers 40¢15¢  
Rogers & Hamilton 40¢15¢  
C. Rogers & Bros. 40¢15¢  
Rogers & Bros. 40¢15¢  
Reed & Barton 40¢40¢5¢  
Wm. Rogers Metal 40¢15¢5¢  
Simpson, Hall, Miller & Co. 40¢15¢5¢  
Holmes & Edwards Silver Co. 40¢15¢5¢  
L. Boardman & Son 50¢12¢4¢

**Miscellaneous**  
Holmes & Edwards Silver Co. 50¢10¢5¢  
No. 67 Mexican Silver 50¢10¢5¢  
No. 30 Silver Metal 50¢10¢5¢  
No. 24 German Silver 50¢10¢5¢  
No. 50 Nickel Silver 50¢5¢  
No. 49 Nickel Silver 50¢10¢5¢  
Wm. Rogers Mfg. Co. 50¢10¢5¢  
Rogers' Silver Metal 50¢10¢5¢  
18¢ Rogers' German Silver 50¢5¢  
22¢ Rogers' Nickel Silver 50¢5¢  
Rogers & Hamilton: 50¢5¢

Steel Goods 40¢10¢  
Cimeter, Flatware 40¢15¢5¢  
Cimeter, Steel Goods 40¢10¢  
Crown Hamilton, Flatware and Cutlery 40¢10¢

German Silver 50¢5¢10¢3¢  
Nickel Silver 50¢5¢10¢5¢  
Britannia 50¢5¢10¢5¢  
Boardman's Nickel Silver, list July 1, 1891 50¢7¢5¢  
Boardman's Britannia Spoons, case lots 50¢5¢ cash

**Springs**  
Torrey's Rod, 39 in. # doz \$1.20 to 1.2  
Warner's No. 1, # doz \$1.60; No. 2, \$3.40 55¢5¢10¢10¢  
Gem (Col), list April 19, 1886 20¢  
Star (Col), list April 19, 1886 20¢10¢  
Victor (Col) 50¢10¢5¢10¢5¢  
Champion (Col) 50¢10¢5¢10¢5¢  
Cowell's, No. 1, # doz \$1.80; No. 2, \$1.50 50¢5¢10¢10¢  
Rubber, complete, # doz \$4.50 55¢10¢  
Hercules 50¢5¢10¢  
Phoenix 35¢4¢

**Carriage, Wagon, &c.**  
Elipitic, Concord, Platform and Half Scroll 50¢10¢60¢10¢10¢ or net prices  
Oliver's Roller Springs 25¢

**Sprinklers, Law**  
Gibbs' Arc # doz, \$12.00  
Gibbs' Hustler # doz, \$6.00

**Squares**  
Steel and Iron 30¢10¢10¢80¢25¢  
Nickel Plated 30¢10¢10¢80¢25¢  
Try Square and T Bevels 50¢10¢10¢  
Diston's Try Square and T Bevels 50¢  
Winterbottom's Try and Miter 30¢10¢  
Starrett's Micrometer Calliper Squares 25¢

Avery's Finish Bevel Squares 40¢  
Avery's Bevel Protractor 50¢

**Squeezers**  
Fodder  
Blair's # doz \$2.00  
Blair's "Climax" # doz \$1.25

**Lemon**  
Porcelain Lined, No. 1, # doz \$6.00 25¢30¢  
Wood, No. 2, # doz \$3.00, 35¢  
Wood, Common # doz \$1.70 to 1.75  
Dunlap's Improved # doz \$3.75, 70¢  
Samuels, No. 1, \$5.00; No. 2, \$9; 12 18¢ doz 25¢10¢  
Jennings' Star # doz \$2.50  
The Boss # doz \$2.50  
Dean's, No. 1, # doz \$6.50; 2, \$3.35; 3, \$1.90; Queen, \$2.50  
King 40¢5¢  
Hotchkiss Straight Flash # doz \$12.00  
Silver & Co., Glass # gro. \$9.00

**Standard Fiber Ware**  
See Ware, Standard Fiber.

**Staples**  
Barbed Blind, 1/4 in. and larger, # 7 7/4¢  
Barbed Blind, 1/4 in. # 8 8/4¢  
Fence Staples, Galvanized, Same Price  
Fence Staples, Plain, # as Prb Wire  
Grand Crossing Tack Co.'s list 75¢10¢

**Steel Butchers'**  
C. & A. Hoffmann's 40¢  
Nichols Bros. 40¢10¢5¢

**Steelyards**  
Stocks and Dies  
Blacksmith's  
Waterford Goods 35¢  
Butterfield's Goods 35¢  
Lightning Screw Plate 25¢30¢  
Reece's New Screw Plates 25¢30¢  
Reversible Ratchet 30¢  
Gardner 25¢  
Green River 35¢50¢

**Stops Bench**  
Morrell's # doz, No. 1, \$10.00; No. 2, \$11.00 40¢20¢  
Hotchkiss # doz, \$5, 10¢10¢10¢  
Weston's, No. 1, \$10.00, No. 2, 25¢10¢5¢

McGill's, # doz \$3. 10¢  
Cincinnati 25¢10¢  
Terrell's Nos. 1 and 2, # doz, \$3; No. 3, \$5.00 20¢10¢

Millers Falls 25¢  
Stearns 20¢10¢

**Stones, Grind-See Grindstones.**

**Scythe Stones**  
Pike Mfg. Co., list April, 1892. 33¢4¢  
Cleveland Stone Co., list Nov. 1892. 33¢4¢

**Oil Stones, &c.**  
Pike Mfg. Co. 5¢  
Hindostan No. 1, # D. 8¢  
Sand Stone 40¢40¢  
Turkey Oil Stone, 4 to 8 10¢  
In 80¢  
Turkey Slips 32¢00

Lilly White Washita 60¢  
Rosy Red Washita 60¢  
Washita Stone, Extra 50¢  
Washita Stone, No. 1 40¢  
Washita Stone, No. 2 30¢  
Lilly White Slips 90¢  
Rosy Red Slips 90¢  
Washita Slips, Extra 80¢  
Arkansas Slips, No. 1 70¢  
Arkansas Stone, No. 1, 3 to 5 in. \$2.80 35¢4¢  
Arkansas Stone, No. 1 1 1/2 to 8 in. \$3.50

Lake Superior # D 13¢  
Lake Superior Slips # D 20¢

**Stove Polish**  
See Polish, Stove.

**Stretchers Carpet**  
Cast Steel, Polished # doz \$2.2  
Cast Iron, Steel Points # doz 75¢80¢  
Socket # doz \$1.75  
Bullard's 25¢25¢10¢

**Strops, Razor**  
Genuine Emerson 60¢60¢25¢  
Imitation # doz \$2.00, 20¢10¢5¢  
Torney's 20¢  
Badger's Belt and Com # doz \$2.00  
Lamont Combination # doz \$4.00  
Jordan's Pat. Padded, list Nov. 1, '89, 50¢  
Electric Cutlery Co. Net prices  
Campbell Cutlery Co. Net prices

**Stuffer, Sausage**  
Miles' Challenge, # doz \$2.00 50¢50¢5¢  
Perry # doz, No. 1, \$15.00; No. 0, \$21.00 50¢5¢50¢10¢  
Draw Cut No. 4, each \$30.00, 40¢  
Enterprise Mfg. Co., list Jan 17, 1893 20¢  
Silver 20¢

**Sweepers, Carpet and Lawn**  
Bissell No. 5 # doz \$17.00  
Bissell No. 8 # doz \$20.00  
Bissell, Grand # doz \$38.00  
Standard # doz \$24.00  
Domestic # doz \$22.00  
Domestic, No. 2 # doz \$22.00  
Grand Rapids # doz \$24.00  
Crown Jewel, No. 1 \$18.00; No. 2, \$19.00; No. 3, \$20.00  
Magic # doz \$15.00  
Improved Parlor Queen # doz \$27.00  
Jannaped # doz \$24.00  
Excelsior # doz \$22.00  
Garland # doz \$18.00  
Parlor Queen # doz \$24.00  
Housewife's Delight # doz \$15.00  
Ladies' Friend # doz \$18.00  
Domestic, No. 2 # doz \$18.00  
Advance # doz \$18.00  
Our Leader # doz \$19.00  
Triumph # doz \$20.00  
Supreme # doz \$22.00  
Easy, Jap'd, # doz \$22.00; Nickel, \$24.00  
Gift Edge # doz \$24.00  
Imperial # doz \$24.00  
Grand Republic # doz \$24.00  
Banner # doz \$22.00; Nickel, \$24.00  
The Star # doz \$21.00  
Reliable # doz \$22.00  
Rapid Jap'd, # doz \$22.00; Nickel, \$24.00  
Our Own # doz \$27.00  
Model # doz \$27.00  
Goshen Sweeper Company, Grand Rapids, Mich., make the following rates:  
5 dozen in 6 months # doz \$1.00  
10 dozen in 6 months # doz \$2.00  
Exception on L.F., when 10 dozen price is \$13.50, and 25 dozen \$18.00.

**Lawn**  
Thompson Mfg. Co. 30¢  
Davies Lawn 25¢

**Tacks, Brads &c.**  
List October 10, 1889. Old established straight weights. Short Weight goods are sold at lower prices.

**Carpet Tacks**  
American, Blued 60¢  
American, Tinned and Cop'd 65¢  
Steel Bright and Blued 60¢  
Steel, Tinned and Cop'd 65¢  
Swedes Iron, S. S., Blued 65¢  
Swedes Iron, S. S., Tinned 70¢  
American Iron Tacks, Domestic 55¢  
American Iron Tacks, Foreign 50¢  
Swedes Iron Tacks 55¢  
S. S., Tinned 40¢  
Lanc, Blued 50¢  
Lanc, Tinned 55¢  
Upholsterers' S. S. 60¢  
Upholsterers' Lanc 50¢  
Gimp Tack 55¢  
S. S., Blued 55¢  
S. S., Tinned 60¢  
Lanc, Blued 50¢  
Lanc, Tinned 55¢

**Basket and Trimmers Tacks**  
Lanc 45¢  
Lanc 50¢  
Hungarian Nails 50¢  
Common and Patent Brads 50¢  
Leathered Tacks 5¢  
Brush Tacks and Nails, S. S. 25¢  
Looking Glass Tacks, S. S. 15¢  
Picture-Frame Points, S. S. 25¢  
Lace Tacks, Blued 45¢  
Lace Tacks, Tinned 50¢  
Finishing Nails 55¢  
Trunk and Clout Nails 60¢  
Black 60¢  
Tinned or Cop'd 65¢  
Basket Nails 60¢  
Clout Nails 60¢  
Oliver Box Nails 60¢  
Tin Capped Nails 60¢

**Miscellaneous**  
Double Point 90¢10¢90¢10¢10¢  
Wire Carpet Nails 60¢10¢  
Claw Handle Carpet # gross \$4.00  
Bonnie Blue # box \$1.50  
New Brad Box # doz 4¢  
Parlan Gilt Nails, cartoon 20¢  
Plymouth Rock Carpet Tacks 20¢  
Home Tacks, No. 50 # case (12 cartons), \$36.00; No. 100, # case (12 cartons), \$72.00  
Home Nails, No. 200, # case (12 cartons), \$30.00; No. 400, # case (12 cartons), \$60.00  
Upholsterers' Nails 60¢10¢

**Wire Brads and Nails**  
Steel-Wire Brads, R. & E. Mfg. Co.'s list 50¢10¢  
See also Nails, Wire.

**Tanks, Oil**  
Emerald, S. S. & Co.: 30-gal. \$8.75; 60-gal. \$11 each 50¢10¢5¢

**Tapes, Measuring**  
American 40¢40¢10¢  
Excelsior, Special list 20¢  
Spring 40¢  
Chetsterman's, Regular list 25¢30¢

**Thermometers**  
Tin Case 80¢80¢10¢

**Thimble Skins-See Skins.**

**Ties, Bale-Steel.**

**Tinners' Shears, &c.**  
See Shears, Tinners' &c.

**Tinware**  
Stamped, Jannaped and Piced, list Jan 20, 1887 70¢10¢70¢25¢

**Tire Benders, Upsetters, &c.**  
See Benders and Upsetters Tire.

**Tobacco Cutters**  
See Cutters, Tobacco.

**Tools**  
Coopers' 20¢  
Bradley's 20¢  
Barton's 20¢20¢5¢  
L. & J. White 20¢5¢  
Albertson Mfg. Co. 20¢  
Beatty's 30¢  
Sandusky Tool Co. 30¢30¢5¢  
Shaves Cincinnati Tool Co. 20¢

**Lumber**  
Ring Peavies, "Blue Line" # doz \$20.00  
Ring Peavies, Common # doz \$18.00  
Steel Socket Peavies # doz \$21.00  
Mail Iron Socket Peavies # doz \$19.00  
Cant Hooks, "Blue Line" # doz \$16.00  
Cant Hooks, Common Finish # doz \$14.00  
Cant Hooks, Mail Socket Clasp, "Blue Line" Finish # doz \$14.00  
Cant Hooks, Mail Socket Clasp, Common Finish # doz \$14.00  
Cant Hooks, Clip Clasp, "Blue Line" Finish # doz \$14.00  
Cant Hooks, Clip Clasp, Common Finish # doz \$12.00  
Hand Spikes # doz 6 ft., \$15.00; 8 ft., \$15.00; 10 ft., \$15.00; 12 ft., \$15.00; 14 ft., \$15.00; 16 ft., \$15.00; 18 ft., \$15.00; 20 ft., \$15.00; 22 ft., \$15.00; 24 ft., \$15.00; 26 ft., \$15.00; 28 ft., \$15.00; 30 ft., \$15.00; 32 ft., \$15.00; 34 ft., \$15.00; 36 ft., \$15.00; 38 ft., \$15.00; 40 ft., \$15.00; 42 ft., \$15.00; 44 ft., \$15.00; 46 ft., \$15.00; 48 ft., \$15.00; 50 ft., \$15.00; 52 ft., \$15.00; 54 ft., \$15.00; 56 ft., \$15.00; 58 ft., \$15.00; 60 ft., \$15.00; 62 ft., \$15.00; 64 ft., \$15.00; 66 ft., \$15.00; 68 ft., \$15.00; 70 ft., \$15.00; 72 ft., \$15.00; 74 ft., \$15.00; 76 ft., \$15.00; 78 ft., \$15.00; 80 ft., \$15.00; 82 ft., \$15.00; 84 ft., \$15.00; 86 ft., \$15.00; 88 ft., \$15.00; 90 ft., \$15.00; 92 ft., \$15.00; 94 ft., \$15.00; 96 ft., \$15.00; 98 ft., \$15.00; 100 ft., \$15.00; 102 ft., \$15.00; 104 ft., \$15.00; 106 ft., \$15.00; 108 ft., \$15.00; 110 ft., \$15.00; 112 ft., \$15.00; 114 ft., \$15.00; 116 ft., \$15.00; 118 ft., \$15.00; 120 ft., \$15.00; 122 ft., \$15.00; 124 ft., \$15.00; 126 ft., \$15.00; 128 ft., \$15.00; 130 ft., \$15.00; 132 ft., \$15.00; 134 ft., \$15.00; 136 ft., \$15.00; 138 ft., \$15.00; 140 ft., \$15.00; 142 ft., \$15.00; 144 ft., \$15.00; 146 ft., \$15.00; 148 ft., \$15.00; 150 ft., \$15.00; 152 ft., \$15.00; 154 ft., \$15.00; 156 ft., \$15.00; 158 ft., \$15.00; 160 ft., \$15.00; 162 ft., \$15.00; 164 ft., \$15.00; 166 ft., \$15.00; 168 ft., \$15.00; 170 ft., \$15.00; 172 ft., \$15.00; 174 ft., \$15.00; 176 ft., \$15.00; 178 ft., \$15.00; 180 ft., \$15.00; 182 ft., \$15.00; 184 ft., \$15.00; 186 ft., \$15.00; 188 ft., \$15.00; 190 ft., \$15.00; 192 ft., \$15.00; 194 ft., \$15.00; 196 ft., \$15.00; 198 ft., \$15.00; 200 ft., \$15.00; 202 ft., \$15.00; 204 ft., \$15.00; 206 ft., \$15.00; 208 ft., \$15.00; 210 ft., \$15.00; 212 ft., \$15.00; 214 ft., \$15.00; 216 ft., \$15.00; 218 ft., \$15.00; 220 ft., \$15.00; 222 ft., \$15.00; 224 ft., \$15.00; 226 ft., \$15.00; 228 ft., \$15.00; 230 ft., \$15.00; 232 ft., \$15.00; 234 ft., \$15.00; 236 ft., \$15.00; 238 ft., \$15.00; 240 ft., \$15.00; 242 ft., \$15.00; 244 ft., \$15.00; 246 ft., \$15.00; 248 ft., \$15.00; 250 ft., \$15.00; 252 ft., \$15.00; 254 ft., \$15.00; 256 ft., \$15.00; 258 ft., \$15.00; 260 ft., \$15.00; 262 ft., \$15.00; 264 ft., \$15.00; 266 ft., \$15.00; 268 ft., \$15.00; 270 ft., \$15.00; 272 ft., \$15.00; 274 ft., \$15.00; 276 ft., \$15.00; 278 ft., \$15.00; 280 ft., \$15.00; 282 ft., \$15.00; 284 ft., \$15.00; 286 ft., \$15.00; 288 ft., \$15.00; 290 ft., \$15.00; 292 ft., \$15.00; 294 ft., \$15.00; 296 ft., \$15.00; 298 ft., \$15.00; 300 ft., \$15.00; 302 ft., \$15.00; 304 ft., \$15.00; 306 ft., \$15.00; 308 ft., \$15.00; 310 ft., \$15.00; 312 ft., \$15.00; 314 ft., \$15.00; 316 ft., \$15.00; 318 ft., \$15.00; 320 ft., \$15.00; 322 ft., \$15.00; 324 ft., \$15.00; 326 ft., \$15.00; 328 ft., \$15.00; 330 ft., \$15.00; 332 ft., \$15.00; 334 ft., \$15.00; 336 ft., \$15.00; 338 ft., \$15.00; 340 ft., \$15.00; 342 ft., \$15.00; 344 ft., \$15.00; 346 ft., \$15.00; 348 ft., \$15.00; 350 ft., \$15.00; 352 ft., \$15.00; 354 ft., \$15.00; 356 ft., \$15.00; 358 ft., \$15.00; 360 ft., \$15.00; 362 ft., \$15.00; 364 ft., \$15.00; 366 ft., \$15.00; 368 ft., \$15.00; 370 ft., \$15.00; 372 ft., \$15.00; 374 ft., \$15.00; 376 ft., \$15.00; 378 ft., \$15.00; 380 ft., \$15.00; 382 ft., \$15.00; 384 ft., \$15.00; 386 ft., \$15.00; 388 ft., \$15.00; 390 ft., \$15.00; 392 ft., \$15.00; 394 ft., \$15.00; 396 ft., \$15.00; 398 ft., \$15.00; 400 ft., \$15.00; 402 ft., \$15.00; 404 ft., \$15.00; 406 ft., \$15.00; 408 ft., \$15.00; 410 ft., \$15.00; 412 ft., \$15.00; 414 ft., \$15.00; 416 ft., \$15.00; 418 ft., \$15.00; 420 ft., \$15.00; 422 ft., \$15.00; 424 ft., \$15.00; 426 ft., \$15.00; 428 ft., \$15.00; 430 ft., \$15.00; 432 ft., \$15.00; 434 ft., \$15.00; 436 ft., \$15.00; 438 ft., \$15.00; 440 ft., \$15.00; 442 ft., \$15.00; 444 ft., \$15.00; 446 ft., \$15.00; 448 ft., \$15.00; 450 ft., \$15.00; 452 ft., \$15.00; 454 ft., \$15.00; 456 ft., \$15.00; 458 ft., \$15.00; 460 ft., \$15.00; 462 ft., \$15.00; 464 ft., \$15.00; 466 ft., \$15.00; 468 ft., \$15.00; 470 ft., \$15.00; 472 ft., \$15.00; 474 ft., \$15.00; 476 ft., \$15.00; 478 ft., \$15.00; 480 ft., \$15.00; 482 ft., \$15.00; 484 ft., \$15.00; 486 ft., \$15.00; 488 ft., \$15.00; 490 ft., \$15.00; 492 ft., \$15.00; 494 ft., \$15.00; 496 ft., \$15.00; 498 ft., \$15.00; 500 ft., \$15.00; 502 ft., \$15.00; 504 ft., \$15.00; 506 ft., \$15.00; 508 ft., \$15.00; 510 ft., \$15.00; 512 ft., \$15.00; 514 ft., \$15.00; 516 ft., \$15.00; 518 ft., \$15.00; 520 ft., \$15.00; 522 ft., \$15.00; 524 ft., \$15.00; 526 ft., \$15.00; 528 ft., \$15.00; 530 ft., \$15.00; 532 ft., \$15.00; 534 ft., \$15.00; 536 ft., \$15.00; 538 ft., \$15.00; 540 ft., \$15.00; 542 ft., \$15.00; 544 ft., \$15.00; 546 ft., \$15.00; 548 ft., \$15.00; 550 ft., \$15.00; 552 ft., \$15.00; 554 ft., \$15.00; 556 ft., \$15.00; 558 ft., \$15.00; 560 ft., \$15.00; 562 ft., \$15.00; 564 ft., \$15.00; 566 ft., \$15.00; 568 ft., \$15.00; 570 ft., \$15.00; 572 ft., \$15.00; 574 ft., \$15.00; 576 ft., \$15.00; 578 ft., \$15.00; 580 ft., \$15.00; 582 ft., \$15.00; 584 ft., \$15.00; 586 ft., \$15.00; 588 ft., \$15.00; 590 ft., \$15.00; 592 ft., \$15.00; 594 ft., \$15.00; 596 ft., \$15.00; 598 ft., \$15.00; 600 ft., \$15.00; 602 ft., \$15.00; 604 ft., \$15.00; 606 ft., \$15.00; 608 ft., \$15.00; 610 ft., \$15.00; 612 ft., \$15.00; 614 ft., \$15.00; 616 ft., \$15.00; 618 ft., \$15.00; 620 ft., \$15.00; 622 ft., \$15.00; 624 ft., \$15.00; 626 ft., \$15.00; 628 ft., \$15.00; 630 ft., \$15.00; 632 ft., \$15.00; 634 ft., \$15.00; 636 ft., \$15.00; 638 ft., \$15.00; 640 ft., \$15.00; 642 ft., \$15.00; 644 ft., \$15.00; 646 ft., \$15.00; 648 ft., \$15.00; 650 ft., \$15.00; 652 ft., \$15.00; 654 ft., \$15.00; 656 ft., \$15.00; 658 ft., \$15.00; 660 ft., \$15.00; 662 ft., \$15.00; 664 ft., \$15.00; 666 ft., \$15.00; 668 ft., \$15.00; 670 ft., \$15.00; 672 ft., \$15.00; 674 ft., \$15.00; 676 ft., \$15.00; 678 ft., \$15.00; 680 ft., \$15.00; 682 ft., \$15.00; 684 ft., \$15.00; 686 ft., \$15.00; 688 ft., \$15.00; 690 ft., \$15.00; 692 ft., \$15.00; 694 ft., \$15.00; 696 ft., \$15.00; 698 ft., \$15.00; 700 ft., \$15.00; 702 ft., \$15.00; 704 ft., \$15.00; 706 ft., \$15.00; 708 ft., \$15.00; 710 ft., \$15.00; 712 ft., \$15.00; 714 ft., \$15.00; 716 ft., \$15.00; 718 ft., \$15.00; 720 ft., \$15.00; 722 ft., \$15.00; 724 ft., \$15.00; 726 ft., \$15.00; 728 ft., \$15.00; 730 ft., \$15.00; 732 ft., \$15.00; 734 ft., \$15.00; 736 ft., \$15.00; 738 ft., \$15.00; 740 ft., \$15.00; 742 ft., \$15.00; 744 ft., \$15.00; 746 ft., \$15.00; 748 ft., \$15.00; 750 ft., \$15.00; 752 ft., \$15.00; 754 ft., \$15.00; 756 ft., \$15.00; 758 ft., \$15.00; 760 ft., \$15.00; 762 ft., \$15.00; 764 ft., \$15.00; 766 ft., \$15.00; 768 ft., \$15.00; 770 ft., \$15.00; 772 ft., \$15.00; 774 ft., \$15.00; 776 ft., \$15.00; 778 ft., \$15.00; 780 ft., \$15.00; 782 ft., \$15.00; 784 ft., \$15.00; 786 ft., \$15.00; 788 ft., \$15.00; 790 ft., \$15.00; 792 ft., \$15.00; 794 ft., \$15.00; 796 ft., \$15.00; 798 ft., \$15.00; 800 ft., \$15.00; 802 ft., \$15.00; 804 ft., \$15.00; 806 ft., \$15.00; 808 ft., \$15.00; 810 ft., \$15.00; 812 ft., \$15.00; 814 ft., \$15.00; 816 ft., \$15.00; 818 ft., \$15.00; 820 ft., \$15.00; 822 ft., \$15.00; 824 ft., \$15.00; 826 ft., \$15.00; 828 ft., \$15.00; 830 ft., \$15.00; 832 ft., \$15.00; 834 ft., \$15.00; 836 ft., \$15.00; 838 ft., \$15.00; 840 ft., \$15.00; 842 ft., \$15.00; 844

| Whips                                                   |       |       |       |       |       |       |       |       |  |
|---------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| American Whip Co.: Length.                              | 4 1/2 | 5     | 5 1/2 | 6     | 6 1/2 | 7     | 7 1/2 | 8 ft. |  |
| X. L. Whalebone Driving.                                | 18.00 | 22.00 | 22.00 | 24.00 | 27.00 | 30.00 | 33.00 | 36.00 |  |
| Eureka, Two-thirds Whalebone.                           | 15.00 | 16.00 | 16.00 | 18.00 | 20.00 |       |       |       |  |
| Bull Bone, Half-length Whalebone.                       |       |       |       |       |       |       |       |       |  |
| American Standard.                                      | 8.00  | 8.50  | 9.50  | 10.50 | 12.00 | 13.50 | 15.00 | 16.50 |  |
| True Grip, Raw Hide Center                              | 6.00  | 6.00  | 6.50  | 7.00  | 7.50  | 8.00  |       |       |  |
| New Name, Stocked Java, Black and Wine Colors.          |       |       |       | 6.00  |       |       |       |       |  |
| American, 38 Pen Whip.                                  |       |       |       | 6.00  |       |       |       |       |  |
| Gents' Light Driving No. 111.                           |       |       |       | 6.00  |       |       |       |       |  |
| Gents' Light Driving No. 106.                           |       |       |       | 6.00  |       |       |       |       |  |
| Hand-made Stocked Java No. 103.                         |       |       |       | 3.75  | 4.00  |       |       |       |  |
| A large variety of cheaper grades.                      |       |       |       |       |       |       |       |       |  |
| Team Whips.                                             |       |       |       |       |       |       |       |       |  |
| Toy Whips.                                              |       |       |       |       |       |       |       |       |  |
| Hardware Assortment, 10/American, 75 Whips for \$50.00. |       |       |       |       |       |       |       |       |  |

Wire and Wire Goods—

| Iron—                          |                  |  |
|--------------------------------|------------------|--|
| Market,                        |                  |  |
| Br. & Ann. Nos. 0 to 18.       | Extra 50¢ to 10¢ |  |
| 75¢ to 10¢ to 18.75¢ to 10¢    | often given      |  |
| Cop'd, Nos. 0 to 18.75¢ to 10¢ |                  |  |
| Galv., Nos. 0 to 18.           | prices often     |  |
| 70¢ to 70¢ to 10¢              | made on          |  |
| Tin'd, Tin'd Nos. 0 to 18.     | large lots.      |  |
| 70¢ to 70¢ to 10¢              |                  |  |

|                                              |                   |
|----------------------------------------------|-------------------|
| Ossawan Mills, Brass and Copper on Spools.   | 50¢ to 10¢        |
| Tate's Spooled Tin'd & Annealed.             | 50¢ to 10¢        |
| Tate's Spooled Cop. and Brass.               | 50¢ to 10¢        |
| Cast Steel Wire.                             | 50¢ to 10¢        |
| Stubs' Steel Wire.                           | 50¢ to 10¢        |
| Steel Music Wire, 12 to 30, imported.        | 50¢ to 10¢        |
| Wire Clothes Line, see Lines.                |                   |
| Wire Picture Cord, see Cord.                 |                   |
| Bright Wire Goods—                           |                   |
| Standard Iron.                               | 85¢ to 10¢ to 90¢ |
| Wire Cloth and Netting.                      |                   |
| Painted Screen Cloth 100 ft \$1.45 to \$1.50 |                   |
| Galvanized Wire Netting.                     | 80¢ to 80¢ to 10¢ |

Wire Barb—  
See Trade Report.  
Wire Rope—See Rope, Wire.  
Wrenches—

|                               |                   |
|-------------------------------|-------------------|
| American Adjustable.          | 40¢               |
| Baxter's Adjustable "S".      | 40¢ to 10¢ to 50¢ |
| Baxter's Diagonal.            | 50¢ to 10¢ to 50¢ |
| Coe's Genuine.                | 50¢ to 10¢ to 50¢ |
| Coe's "Mechanics".            | 50¢ to 10¢ to 50¢ |
| Girard Standard.              | 55¢ to 10¢ to 70¢ |
| Lamson & Sessions' Engineers. | 60¢ to 10¢        |
| Lamson & Sessions' Standard.  | 70¢ to 10¢        |
| P. S. & W. Agricultural.      |                   |
| Girard Agricultural.          |                   |
| Lamson & Sessions' Agric'l.   | 75¢ to 10¢ to 80¢ |
| W. & B. Diamond.              |                   |

|                             |                   |
|-----------------------------|-------------------|
| Bemis & Call's:             |                   |
| Pat. Combination Bright.    | 40¢ to 55¢        |
| Pat. Combination Black.     | 40¢ to 10¢        |
| Merrick's Pattern.          | 45¢               |
| Brigg's Pattern.            | 30¢ to 10¢        |
| Cylinder or Gas Pipe.       | 45¢ to 55¢        |
| No. 3 Pipe.                 | 55¢               |
| Alken's Pocket (Bright).    | 50¢ to 10¢        |
| The Favorite Pocket.        | 50¢ to 10¢        |
| Webster's Pat. Combination. | 25¢               |
| Boardman's.                 | 80¢               |
| Always Ready.               | 25¢ to 55¢        |
| Alligator.                  | 50¢               |
| Donohue's Engineer.         | 20¢ to 10¢        |
| Eagle.                      | 50¢ to 10¢        |
| Acme, Bright.               | 50¢ to 10¢        |
| Acme, Nickel.               | 40¢ to 25¢        |
| Hercules.                   | 70¢ to 70¢ to 55¢ |
| Walker's.                   | 55¢ to 35¢        |
| Diamond Steel.              | 55¢ to 35¢        |
| Cincinnati Brace Wrenches.  | 25¢ to 10¢        |
| Tatler's Vise Wrench.       | 55¢ to 10¢ to 35¢ |

Wringers, Clothes—

|                                        |         |
|----------------------------------------|---------|
| Am. Wringer Co.'s list, July 1, '93.   | 2% cash |
| Colby Wringer Co., list, Sept. 1, '91. | 2% cash |
| Lovell Mfg. Co., list, July 1, 1892.   | 2% cash |
| Peerless Mfg. Co., list, Feb., 1892.   | 2% cash |
| National Wringer & Mfg. Co., list      |         |
| June 1, 1892.                          | 2% cash |

Wrought Goods—

|                                            |                          |
|--------------------------------------------|--------------------------|
| Staples, Hooks, &c., list, March 17, 1892. | 85¢ to 10¢ to 85¢ to 15¢ |
|--------------------------------------------|--------------------------|

Paints, Oils and Colors.—Wholesale Prices.

Animal and Vegetable Oils—

|                                         |            |
|-----------------------------------------|------------|
| Linseed, City, raw, per gal.            | 47         |
| Linseed, City, boiled.                  | 50         |
| Linseed, Western, raw.                  | 47         |
| Lard, City, Extra Winter.               | 70         |
| Lard, City, Prime.                      | 70         |
| Lard, City, Extra No. 1.                | 50         |
| Lard, City, No. 1.                      | 45         |
| Lard, Western, prime.                   | 70         |
| Cotton-seed, Crude, prime.              | 29         |
| Cotton-seed, Crude, off grades.         | 25         |
| Cotton-seed, Summer Yellow, prime.      | 36         |
| Cotton-seed, Summer Yellow, off grades. | 34         |
| Sperm, Crude.                           | 65         |
| Sperm, Natural Spring.                  | 66         |
| Sperm, Bleached Spring.                 | 71         |
| Sperm, Natural Winter.                  | 71         |
| Sperm, Bleached Winter.                 | 76         |
| Whale, Crude.                           | 45         |
| Whale, Natural Winter.                  | 45         |
| Whale, Bleached Winter.                 | 48         |
| Whale, Extra Bleached.                  | 50         |
| Sea Elephant, Bleached.                 |            |
| Winter.                                 |            |
| Menhaden, Crude, Sound.                 | 32         |
| Menhaden, Crude, Southern.              | 32         |
| Menhaden, Light Pressed.                | 36         |
| Menhaden, Bleached W'ter.               | 41         |
| Menhaden, Extra Bleached.               | 43         |
| Tallow, City, prime.                    | 45         |
| Tallow, Western, prime.                 | 48         |
| Cocanut, Ceylon.                        | 55¢ to 60¢ |
| Cocanut, Cochiti.                       | 60¢ to 65¢ |
| Cod, Domestic.                          | 38         |
| Cod, Foreign.                           | 42         |
| Red Elaine.                             | 35         |
| Red Saponified.                         | 35         |
| Bank.                                   | 38         |
| Straits.                                | 39         |
| Olive, Italian, bbls.                   | 58         |
| Neatsfoot, prime.                       | 60         |
| Palm, prime, Lagos.                     | 50¢ to 6   |

Mineral Oils—

|                                        |       |
|----------------------------------------|-------|
| Black, 20 gravity, 25 to 30 cold test. | 7     |
| Black, 20 gravity, 15 cold test.       | 7 1/2 |
| Black, 20 gravity, summer.             | 6     |
| Cylinder light, filtered.              | 14    |

|                                  |        |
|----------------------------------|--------|
| Cylinder, dark, filtered.        | 10     |
| Paraffine, 23 1/2 to 24 gravity. | 11     |
| Paraffine, 25 gravity.           | 11     |
| Paraffine, 28 gravity.           | 7      |
| Paraffine, red.                  | 10 1/2 |

Paints and Colors—

|                                                                 |         |
|-----------------------------------------------------------------|---------|
| Barytes, Foreign, 10 ton.                                       | \$22.00 |
| Barytes, Amer. floated.                                         | 20.00   |
| Barytes, Amer. No. 1.                                           | 16.00   |
| Barytes, Amer. No. 2.                                           | 13.00   |
| Barytes, Amer. No. 3.                                           | 11.00   |
| Blue, Celestial.                                                | 40      |
| Blue, Prussian.                                                 | 25      |
| Blue, Ultramarine.                                              | 8       |
| Brown, Spanish.                                                 | 1 1/2   |
| Brown, Vandyke, Amer.                                           | 3       |
| Brown, Vandyke, English.                                        | 6       |
| Carmine, No. 40, in bulk.                                       | 2.75    |
| Carmine, No. 40, in boxes or barrels.                           | 2.85    |
| Carmine, No. 40, in ounce bottles.                              | 3.75    |
| Chalk, in bulk.                                                 | 1.75    |
| Chalk, in bbls.                                                 | 33      |
| China Clay, English.                                            | 10      |
| Cobalt Oxide, prep'd.                                           | 9.00    |
| Cobalt Oxide, black.                                            |         |
| Cobalt Oxide, black, lots 100 lb.                               | 1.90    |
| Green, Paris, in bulk.                                          | 1.96    |
| Green, Paris, 170 to 175 lb.                                    | 10      |
| Green, Paris, small pack.                                       | 12      |
| Green, Chrome, ordinary.                                        | 6       |
| Green, Chrome, pure.                                            | 22      |
| Lead, Eng. B. B. white.                                         | 7       |
| Lead, Anna White, dry or in oil.                                |         |
| Kegs, lots less than 500 lb.                                    | 6 1/2   |
| Kegs, lots 500 lb to 5 tons.                                    | 6       |
| Kegs, lots 5 tons to 12 tons.                                   | 5 1/2   |
| Kegs, lots 12 tons and over.                                    | 5 1/4   |
| Lead, White, in oil, 25 lb tin.                                 |         |
| Lead, White, in oil, 12 1/2 lb tin.                             |         |
| Lead, White, add to keg price.                                  | 1       |
| Lead, White, in oil, 1 to 5 lb assorted tins, add to keg price. | 2 1/2   |
| Lead, Red, bbls. and 1/2 bbls.                                  | 5 1/2   |
| Lead, Red, kegs.                                                | 5 1/2   |
| Litharge, kegs.                                                 | 5 1/2   |
| Litharge, bbls. and 1/2 bbls.                                   | 5 1/2   |

TERMS, &c.—Lead and Litharge.—On lots of 500 lb or over, 60 days' time or 2% discount for cash if paid within 15 days of date of invoice.

|                                       |              |
|---------------------------------------|--------------|
| Ocher, Rochelle.                      | 1.35         |
| Ocher, Fuch Washed.                   | 1 1/2        |
| Ocher, German Washed.                 | 1 1/2        |
| Ocher, American.                      | 1 1/2        |
| Orange Mineral, English.              | 8 1/2        |
| Orange Mineral, French.               | 10           |
| Orange Mineral, German.               | 8 1/2        |
| Orange Mineral, American.             | 8 1/2        |
| Paris White, English Cliff.           | 1.00         |
| Paris White, American.                | 65           |
| Red, Indian, English.                 | 5 1/2        |
| Red, Indian, American.                | 2            |
| Red, Turkey.                          | 9            |
| Red, Tuscan.                          | 9            |
| Red, Venetian, American.              | 130 lb. 1.00 |
| Red, Venetian, English.               | 1.20         |
| Sienna, Italian, Burnt and Powd.      | 4            |
| Sienna, Ital., Burnt Lumps.           | 1 1/2        |
| Sienna, Ital., Raw, Powd.             | 4 1/2        |
| Sienna, Ital., Raw, Lumps.            | 1 1/2        |
| Sienna, American, Raw.                | 1 1/2        |
| Sienna, American, Burnt and Powdered. | 1 1/2        |
| Talc, French.                         | 1 1/2        |
| Talc, American.                       | 1 1/2        |
| Terra Alba, F. Ch. 100 lb.            | 70           |
| Terra Alba, English.                  | 70           |
| Terra Alba, American No. 1.           | 65           |
| Terra Alba, American No. 2.           | 45           |
| Umber, Turkey, Burnt and Powdered.    | 3 1/2        |
| Umber, Turkey Bnt. Ln.                | 2 1/2        |
| Umber, Turkey, Raw and Powdered.      | 3 1/2        |
| Umber, Turkey, R'w Lumps.             | 2 1/2        |
| Umber, Turkey, Bnt. Amer.             | 1 1/2        |
| Umber, Turkey, R'w Amer.              | 1 1/2        |
| Yellow, Chrome.                       | 10           |
| Vermilion, American Lead.             | 11           |
| Vermilion, Quick's'er, bulk.          | 43           |
| Vermilion, Quick's'er, bags.          | 44           |
| Vermilion, Quicksilver sm't pks.      | 52           |
| Vermilion, English Import.            | 80           |
| Vermilion, Imitation, Eng.            | 8            |
| Vermilion, Trieste.                   | 80           |
| Vermilion, Chinese, bulk.             | 92 1/2       |
| Whiting Common, 100 lb.               | 37 1/2       |
| Whiting Gliders.                      | 45           |

|                                                                                                                                                                  |        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Zinc, American, dry.                                                                                                                                             | 3 1/2  |
| Zinc, French, Red Seal.                                                                                                                                          | 7 1/2  |
| Zinc, French, Green Seal.                                                                                                                                        | 9      |
| Zinc, French, V. M. X.                                                                                                                                           | 7      |
| Zinc, Antwerp, Red Seal.                                                                                                                                         | 7 1/2  |
| Zinc, Antwerp, Green Seal.                                                                                                                                       | 7 1/2  |
| Zinc, German, L. Z. O.                                                                                                                                           | 6 1/2  |
| Zinc, V. M. in Poppy Oil, G. Seal, lots of 1 ton and over.                                                                                                       | 10 1/2 |
| Zinc, V. M. in Poppy Oil, Red Seal, lots of 1 ton and over.                                                                                                      | 11     |
| lots of less than 1 ton.                                                                                                                                         | 10 1/2 |
| lots of less than 1 ton.                                                                                                                                         | 10 1/2 |
| Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 15; 25 bbls. 2%; 50 bbls. 4%. No discount allowed on less than bbl. lots. |        |

Colors in Oil—

|                          |    |
|--------------------------|----|
| Black, Drop, Frankfort.  | 25 |
| Black, Drop, English.    | 12 |
| Black, Drop, Domestic.   | 7  |
| Black, Lamplack, Best.   | 20 |
| Black, Lamplack, Common. | 13 |
| Black, Ivory.            | 8  |
| Blue, Chinese.           | 35 |
| Blue, Prussian.          | 20 |
| Blue, Ultramarine.       | 12 |
| Brown, Vandyke.          | 7  |
| Green, Chrome.           | 8  |
| Green, Paris.            | 18 |
| Sienna, Raw.             | 7  |
| Sienna, Burnt.           | 7  |
| Umber, Raw.              | 7  |
| Umber, Burnt.            | 7  |

Putty—

|                          |       |
|--------------------------|-------|
| In barrels and 1/2 bbls. | .013¢ |
| In tubs.                 | .013¢ |
| In tin cans.             | .013¢ |
| In bladders.             | .013¢ |

Spirits Turpentine—

|                  |      |
|------------------|------|
| In regular bbls. | .30¢ |
| In machine bbls. | .31  |

Glue—

|               |    |
|---------------|----|
| Low Grade.    | 8  |
| Cabinet.      | 12 |
| Medium White. | 13 |
| Extra White.  | 17 |
| French.       | 10 |
| English.      | 10 |
| Irish.        | 12 |

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**FEBRUARY 28, 1894.**

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### Bar Iron from Store—

**Merchant Steel from Store—**

**Sheet Iron from Store—**

Open Hearth Steel.

**Russia. Plashed, &c.**

## Foreign Steel from Store

## METALS

## Tin Plates—

and Calland Grade. IC, 10. x14..  
" " IC 12. x12

**Coke Plates—Bright—**

### Charcoal Plates—Terne-

Grade.—10 x 20..... ②  
14 x 20..... ③

28.....112 sheets.....

20.....

**Ingot—**

ed by the Association of Copper

(Weight = 2.1 lbs.)

Bolt Copper,  $\frac{3}{8}$  inch diameter and over,  $\$22\frac{1}{2}$  per  
Circle, Segments and Pattern Sheets, 60 in.  
diameter and less,  $\$4\frac{1}{2}$   $\frac{1}{2}$  advance over prices  
of Sheet Copper required to cut them from.  
Circle, Segments and Pattern Sheets, over 60  
in. diameter, up to 96 in. diameter inclusive,  
 $\$4\frac{1}{2}$   $\frac{1}{2}$  advance over prices of Sheet Copper  
required to cut them from.  
Circle, Segments and Pattern Sheets, over 96  
in. diameter,  $\$4\frac{1}{2}$   $\frac{1}{2}$  advance over prices of  
Sheet Copper required to cut them from.  
Cold or Hard Rolled Copper 14 oz.  $\frac{1}{2}$  square foot  
and heavier,  $\$4\frac{1}{2}$   $\frac{1}{2}$  over the foregoing prices.  
Cold or Hard Rolled Copper lighter than 14 oz.  $\frac{1}{2}$   
square foot,  $\$2\frac{1}{2}$   $\frac{1}{2}$  over the foregoing prices.  
All Polished Copper over 20 in. wide,  $\$2\frac{1}{2}$   $\frac{1}{2}$   
advance over the foregoing prices.

**Copper Wash Bowl Bottoms-**

### Seamless Brass Tubes—

|       |               |               |               |               |               |    |
|-------|---------------|---------------|---------------|---------------|---------------|----|
| N. G. | $\frac{9}{8}$ | $\frac{7}{8}$ | $\frac{9}{8}$ | $\frac{9}{4}$ | $\frac{7}{8}$ | 1  |
| 2.12  | 22            | 22            | 22            | 22            | 22            | 22 |

Copper, Bronze and Gilding Tube, 8¢ per lb addit

count from list.....30

|                 |       |       |       |       |       |       |
|-----------------|-------|-------|-------|-------|-------|-------|
| Non High Brass: | 1 in. | 1 in. | 1 in. | 1 in. | 1 in. | 1 in. |
| Wider than      | 2     | 10    | 12    | 14    | 16    | 18    |

Discount from List 15 % to 25 %.

[illegible]

**Discount 15 % to 25 %.**

---

### Tablin Bronze

**Spelter**

Bertha (pure).....

Lead=

**Solder**

### Antimony

## Aluminum

## Old Meta

Light and Tinned Copper .....

Lead.....  
 Lag Lead

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